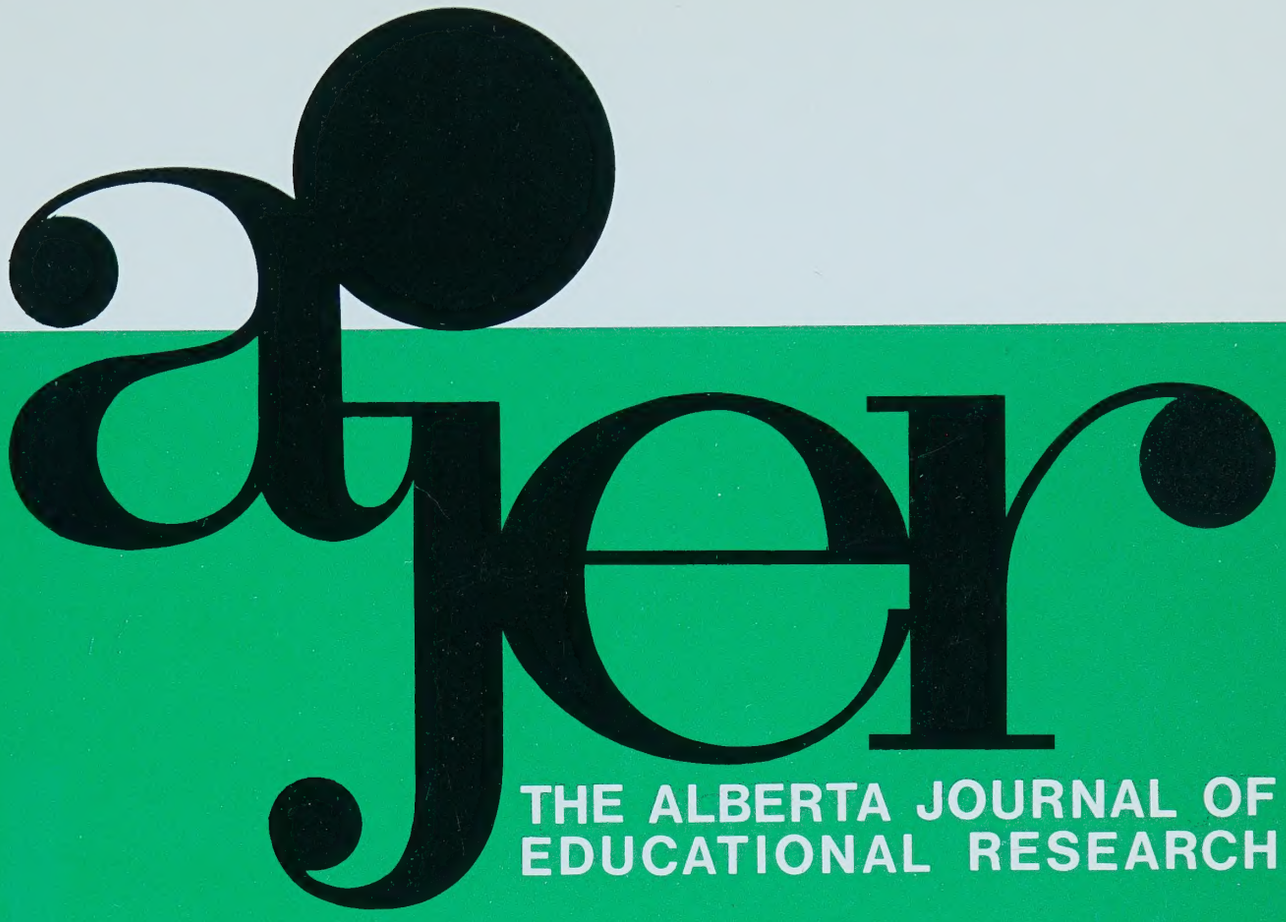

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FACULTY OF EDUCATION
The University of Alberta

The Alberta Journal of Educational Research *Vol. XXVI, No. 2, June, 1980*

CHARLES K. CURTIS
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Developing Critical Thinking Skills in Nonacademic Social Studies Classes

Frequent references to critical thinking as an objective of social studies instruction are found in the literature. This paper reports the findings of a study intended to teach critical thinking skills in nonacademic secondary classes. Two research designs, the nonequivalent control group design and the pretest-posttest design, were used in the study. Students in the experimental classes and in the classes included in the one-group, pretest-posttest design were taught the skills identified in Ennis' model of critical thinking as they investigated a contemporary community problem. Students in the control classes followed the prescribed social studies programs. A significant difference in favour of the experimental group was found between the adjusted mean posttest scores of the experimental and control groups on the Cornell Critical Thinking Test. The difference between the pretest and posttest mean scores on this instrument was significant for the students in the one-group, pretest-posttest design. Geographic location and sex of the students were not significant factors in the study.

Concern with critical thinking as an objective of public school education dates back at least to the period when the philosophy of John Dewey was significantly influencing educational practice. Contemporary social studies literature abounds with references to the commitment of a democratic society to instruct its youth in the intellectual skills deemed essential for making rational decisions about societal problems. Despite this apparent interest, there is a paucity of literature describing research studies that have attempted to identify effective strategies for teaching critical thinking skills in social studies classes – a paradoxical situation that has been noted by, among others, Ellis

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Prior to accepting an appointment to the Social Studies Department, The University of British Columbia, Dr. Curtis taugnt social studies and English in slow learner programs in secondary schools in the Vancouver area. In 1978, he completed a doctorate in Special Education at Utah State University. For his dissertation, which was concerned with citizenship education for slow learners, Curtis received the Exemplary Dissertation Award for 1978 from the National Council for the Social Studies.

(1942), Harris (1960), Shaver (1962), and Ennis (1963). This article reports a study designed to test the efficacy of a program for teaching critical thinking to slow-learning secondary students.

Review of Literature

Critical thinking was defined by Ennis (1962) to be the "correct assessing of statements" (p. 83). Initially, he described critical thinking as consisting of 12 aspects, reduced in a later article (Ennis, 1964) to nine. The critical thinker was characterized as possessing proficiency in judging whether (1) a statement follows from the premises, (2) something is an assumption, (3) an observation statement is reliable, (4) a simple generalization is warranted, (5) an hypothesis is warranted, (6) a theory is warranted, (7) an argument depends on an ambiguity, (8) a statement is overvague or overspecific, and (9) an alleged authority is reliable. A tenth proficiency was added in 1971 – judging whether a reason is relevant (Ennis & Millman, 1971, p. 1).

The concept of critical thinking that Ennis proposed was comprised of three basic factors or dimensions: the logical, critical and pragmatic dimensions. According to Ennis (1964), the determination of these dimensions and the identification of the several aspects resulted from a "study of the literature in education, philosophy, and psychology" (p. 599). Although this model has been criticized (e.g., Berlak, 1965; Shaver & Berlak, 1968, p. 339), the proficiencies that Ennis enumerated correspond for the most part with the sets of critical thinking skills that have been accepted by social studies educators (e.g., Aldrich, 1948; Decaroli, 1973; Henderson, 1950; Morse & McCune, 1971).

There have been few research studies concerned with the development of critical thinking skills in social studies classes, and those studies have frequently produced inconsistent and inconclusive findings. Nevertheless, suggestions for teaching critical thinking skills can be inferred from several pieces of social studies and related research. Among these suggestions are the following: First, increases in critical thinking are not likely to occur as a by-product of instruction aimed at other objectives (Barratt, 1965; Henderson, 1950; Kemp, 1963; Hyram, 1957). Second, teaching strategies that focus on the teaching of specific critical thinking skills as elements in a model for investigating problems have been successful (Armstrong, 1971; Cousins, 1963; Lee, 1968; McGarry, 1962; Yost, 1973). Third, the subject matter used to teach critical thinking has included the study of current events and contemporary problems and issues (Anderson, Marcham & Dunn, 1944; Creutz & Gezi, 1965; Miller & Weston, 1947; Oliver & Shaver, 1966). Fourth, there is evidence to support the contention that children in the elementary grades can be taught critical thinking skills (Boedeker, 1971; Brown, 1969; Hunkins & Shapiro, 1967; Hyram, 1957; Lee, 1968; Pitts-Scarangello, 1972).

Method

Sample

The high school students (N = 225) involved in the present study were enrolled in special classes for slow learners and nonachievers, and in nonacademic, vocationally-oriented programs in eight schools located in six school districts throughout British Columbia. The ages of the students ranged from 15 to 21 years, and mean ages for the classes ranged from 15.5 to 18.3 years. A comparison of these mean ages with the mean ages for comparable grades revealed that project students tended to be at least two years older than their peers in the academic classes. The percentage of boys (47.1%) was not significantly different from the percentage of girls (52.9%). The school districts, selected for inclusion in the study by the use of a table

of random numbers, varied in geographic size, numbers of schools, teachers, and students. The communities in which the project schools were located varied in size and degree of urbanity, from the Greater Vancouver region to small rural communities in the interior of the province.

Program

The treatment program was developed from inferences based on the preceding research studies of critical thinking. During the four-month period of the project, students in the experimental classes employed an inquiry problem-solving model to investigate the problems and issues related to the conditions of housing in their communities. In particular, student inquiry addressed the following questions: Does a housing problem exist in your community? What factors affect the cost of housing? What can be done to lower the cost of housing? What can be done to provide more rental accommodations? What are the rights and responsibilities of renters and owners? What should be done about the housing problem? and, What are the appropriate methods for taking social action in a democratic society? A variety of reading selections that included articles from newspapers and magazines, government publications, and brochures from political parties and special interest groups were provided to each class. Additionally, field studies and interviews with local resource persons were sources of relevant data for the students in their communities.

The introductory lessons consisted of student surveys of the housing market in each project community. These surveys, lasting up to three weeks in most cases, concluded with the students in each class deciding that a housing problem did exist for many people in their community.

The second part of the housing study pertained to the investigation of the several factors that affect the costs of housing. This was divided into three sections: critical thinking lessons, reading selections and graphic materials dealing with the conditions that were purported by the individuals and special interest groups to result in expensive housing, and interviews with local resource persons.

During the first critical thinking lesson, students were introduced to a general concept of critical thinking, and a rationale for developing critical thinking skills in the social studies program was discussed. The following lesson had the students consider a modified list of the critical thinking skills enumerated by Ennis (1962). Additionally, students were taught to use evaluative criteria (selected from Chapman & Gross, 1973, p. 190; Chausow, 1965, pp. 79-81; Fraenkel, 1973, p. 263; Fraser & West, 1962, p. 281; Quillen & Hanna, 1948, pp. 334-336; Shaver & Larkins, 1973) for making the judgments in Ennis' list.

Subsequent to the introductory lessons, students listened to a tape recording of a radio interview conducted by Vancouver broadcaster Jack Webster, CJOR, with Bruce York. York, as President of the British Columbia Tenants Association, had been invited on the program to comment about the B.C. Landlord and Tenant Act (June 20, 1974). The two and one-half hour interview had been edited by the investigator to 25 minutes, and it included a heated discussion about the feasibility of rent controls, the interest rates charged by mortgage companies, and the need for government intervention in the housing market. Telephone calls from three listeners were also included on the tape. To complete the work sheet accompanying the tape, students identified, weighed, and evaluated arguments by both the interviewer and interviewee, searched out words and phrases that were emotionally loaded, defined terms in arguments, located irrelevant questions and comments, found examples of fact and opinion statements, and evaluated analogies. In the majority of classes, the analysis and discussion of the broadcast was carried on over a minimum of three periods,

during which time the tape was played several times.

The analysis of the radio broadcast was followed by several lessons that consisted of an examination of *They Build Houses, Don't They?*, a comic book published by the Exploding Myths Comic Collection of Toronto, Ontario. The assignment for these lessons included questions that had students study frames in order to locate evidence of the cartoonist's bias, identify his point of view, and evaluate his arguments. Additional activities had the students speculate as to how the interviewee on the radio broadcast discussed earlier might react to the way the housing problem was described in the comic book, and as to how landlords, developers, renters, and buyers would have been represented had the comic book been prepared by realtors. Finally, the students were required to evaluate the comic book and decide whether it presented an accurate assessment of the housing problem and to provide evidence to support their opinion.

When presented with data in succeeding lessons, students were encouraged to note the source of the information, suggest the frame of reference of the author, and search the material for evidence of bias, ambiguity, and contradiction. In addition, they were to judge the authoritativeness of the data and the validity of the arguments presented.

The Control Class

During the period of the housing study, students in the control classes were taught the regular social studies courses from the provincial curriculum guide. In schools 1 and 2, instruction consisted of a chapter by chapter study of a textbook on urbanization in Canada. In both control classes, questions that required students to locate facts, identify main ideas, and reach conclusions were assigned for each chapter. Additionally, students in these classes completed a major project – in most cases, a model or diagram illustrating some aspect of urbanization. In school 3, social studies for the control class centered on a chronological study of Canadian history. During the several months required by the experimental students for the housing project, the control students progressed in their study from New France, through the British Conquest and the establishment of Upper and Lower Canada, to the British North America Act of 1867. In addition to class discussions, learning experiences included answering questions (similar to those mentioned above) for each chapter of the textbook. This approach was also used in school 4. The control class in this school studied industrialization in the Soviet Union and the European Common Market.

Design and Instrumentation

In four of the eight project schools, two classes were available for inclusion in the study. In these schools, class placement in either the experimental or control categories was dependent upon the chance toss of a coin. In each of the remaining four schools, a single class only was available for the study.[1] Two research designs were employed. The first, a nonequivalent control group design, was used in the schools where both the experimental and control classes existed. The second, a one-group pretest-posttest design, was used in the single class schools. Because of the obvious inadequacies of the latter design, that part of the study was regarded as providing data which, if in accord with, would replicate and substantiate the findings with the nonequivalent control group design.

Critical thinking was assessed by the pretest and posttest administration[2] of the Cornell Critical Thinking Test (CCTT). This instrument consists of 72 items organized into four sections that purport to assess competency in most of the critical thinking skills listed previously (Ennis & Millman, 1971, p. 3).

The validity of the CCTT was dealt with by Ennis and Millman (1971, pp. 12-33)

through a series of correlations between scores on the CCTT and scores on measures of intelligence and of academic achievement. For this study, Pearson product-moment *r*'s were calculated between pretest scores for the project students and IQ scores on the Otis Quick-Scoring Mental Ability Test ($r = .54$; df = 159; $p<.01$), and between pretest scores and reading comprehension scores from the Gates-Macginitie Reading Test ($r = .38$; df = 221; $p<.01$).

Two reliability coefficients were computed for the project data. The Kuder-Richardson 20 formula yielded a coefficient of internal consistency of .91 for the pooled classes on the pretest administration of the CCTT. A reliability estimate of .87 was calculated using the procedure suggested by Winer (1971, pp. 283-289).

Analysis

Two-way classification analysis of covariance with the data arranged according to treatment and geographic location, and with IQ and pretest scores as covariates, was the basic analysis used for the data from the nonequivalent control group design. The general least squares solution for unequal-sized groups was used, as recommended by Winer (1971, p. 498). The *t* test for correlated data was used to test pretest-posttest differences for the one-group design data.

Additional analyses were run to determine whether sex was a significant factor in the study. The general least squares solution was used to analyze the data from the nonequivalent control group. A one-way classification analysis of covariance (with pretest scores as covariates[3]) was used with the data collected from the one-group, pretest-posttest design arranged according to sex.

Results

Nonequivalent Control Group Design

As can be seen in Table 1, the difference between the adjusted mean posttest scores for treatment was statistically significant ($p<.01$) in favour of the experimental group. $\bar{F}$ ratios for "geographic location" and "interaction" were not significant.

TABLE 1

ANALYSIS OF COVARIANCE [a] FOR THE ADJUSTED MEAN POSTTEST SCORES ON THE CCTT OF THE EXPERIMENTAL AND CONTROL GROUPS

Source of Variation	*Degrees of Freedom*	*Sums of Squares*	*Mean Square*	*F Ratio*	*p*
Treatment	1	451.04	451.04	7.69	<.01
Geographic Location	3	66.00	22.20	.38	>.05
Interaction	3	75.01	25.00	.43	>.05
Error	121 [b]	7,100.79	58.68		
Total	130	16,878.84			

[a] A test for homogeneity of regression yielded an *F* ratio of .43(df=2, 127;$p>.05$), indicating that differences between regression slopes were not statistically significant.

[b] ANCOVA model used for least squares analysis considers covariates as sources of variation.

Criterion and control variable means for the pooled data for the experimental and control groups are given in Table 2. Table 3 contains the adjusted mean posttest scores arranged according to geographic location.

TABLE 2

CRITERION AND CONTROL VARIABLE MEANS AND STANDARD DEVIATIONS FOR THE SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS ON THE CCTT

		IQ		*Pretest*		*Posttest*		*Adjusted Posttest*
Group	*Number*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*
Experimental	70	97.21	12.07	17.99	11.86	24.96	11.30	27.12
Control	63	105.43	10.68	22.90	10.43	25.13	11.40	22.96

TABLE 3

ADJUSTED MEAN POSTTEST SCORES ON THE CCTT FOR THE EXPERIMENTAL AND CONTROL GROUPS ARRANGED ACCORDING TO GEOGRAPHIC LOCATION

Geographic Location	*Number*	*Experimental Group*	*Control Group*	*Row Means*
1	38	28.25	22.02	25.14
2	34	27.13	25.02	26.07
3	23	25.69	21.92	23.80
4	38	27.40	22.87	25.14

An Eta^2 of .03 was calculated by dividing the sum of squares due to the treatment by the total sum of squares (Ferguson, 1976, pp. 236-237). This indicated the proportion of variance on the posttest scores attributed to the treatment category after controlling for geographic location, and pretest and IQ scores.

One-group Pretest-posttest Design

With a difference of six points between the means of the pretest and posttest scores (Table 4) and a t value of 4.72 ($p<.01$), it was concluded that the increase in critical thinking scores was greater than would be expected to occur by chance fluctuation alone.

TABLE 4

T TEST OF THE COMPARISON OF THE PRETEST AND POSTTEST MEAN SCORES ON THE CCTT FOR THE STUDENTS IN THE ONE-GROUP PRETEST-POSTTEST DESIGN

Number	*Degree of Freedom*	*Pretest Mean*	*S.D.*	*Posttest Mean*	*S.D.*	*t Value*	*p*
66	65	15.41	9.67	21.65	10.75	4.72	<.01

The pretest and posttest mean scores for the individual classes in the one-group, pretest-posttest design are given in Table 5.

TABLE 5

PRETEST AND POSTTEST MEAN SCORES AND STANDARD DEVIATIONS FOR THE CCTT FOR THE STUDENTS IN THE ONE-GROUP PRETEST-POSTTEST DESIGN

School	*Number*	*Pretest Mean*	*S.D.*	*Posttest Mean*	*S.D.*
5	20	15.90	9.56	24.40	10.17
6	20	13.95	9.20	22.60	12.36
7	20	19.80	8.84	22.60	14.59
8	6	4.00	2.97	6.17	4.12

Sex

The analysis of scores on the CCTT collected from the nonequivalent control group and arranged according to treatment and sex yielded nonsignificant F ratios for both sex ($F = 1.31$; df = 1, 130; $p>.05$) and the interaction effect of treatment and sex ($F = .15$; df = 1, 130; $p>.05$). A nonsignificant F ratio ($F = .55$; df = 1, 64; $p>.05$) was also generated by the analysis of the data from the one-group, pretest-posttest design.

Discussion

The conclusion that the treatment program had a significant effect upon critical thinking skills resulted from the analyses of the responses to the items on the CCTT that revealed significant differences between the adjusted mean posttest scores in favour of the experimental students in the nonequivalent control group design, and between the pretest and posttest mean scores for the students in the one-group, pretest-posttest design. This conclusion supported the findings of previous research pertaining to critical thinking. That is, it indicated that a program consisting of instruction and practice in specific critical thinking skills, within the context of an investigation of a contemporary community problem, was a more effective approach for teaching critical thinking than was conventional subject matter oriented instruction. The Eta^2 of .03, however, may cause some readers to question the educational significance of the conclusion.[4]

Conclusion

The evidence from this study suggests that a program consisting of especially prepared lessons designed to teach specific critical thinking skills as part of an inquiry into a community problem is appropriate pedagogy for teaching critical thinking in nonacademic social studies classes. The data also suggest that the adequacy of such a strategy is unaffected either by the place of student residence or by the sex of the students. Furthermore, the evidence implies that critical thinking skills tend not to be developed in nonacademic classes through instruction in the prescribed social studies curricula.

Notes

1. In small communities in the coastal and interior regions of British Columbia, the entire school population of slow learners or nonacademic students for a particular grade may be enrolled in a single class.
2. The length of the period between the administration of the pre- and posttests was approximately five months.
3. IQ scores were not available for the students in the one-group, pretest-posttest design.
4. A perusal of reports of critical thinking research in educational journals for the period 1949-1978 uncovered only three studies for which ANOVA or ANCOVA tables were available. Each study recorded statistically significant *F* ratios for the treatment variable. Eta^{2}s of .01 (Hardy, 1971), .02 (Wallen, Haubrich & Reid, 1963), and .08 (Wood, Bradae, Barnhart & Kraft, 1970) were calculated from the data contained in these tables.

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Social Background, Aspirations and Academic Achievement: An Analysis Based on Longitudinal Data for Australia

A model of the social processes involved in the production of individual educational achievement is formulated and used to interpret data for Australia. The model is based on that proposed by Marjoribanks (1975) and draws on an analytical theory of social interaction proposed by Harre and Secord (1972). Both the "needs press" paradigm and "social learning theory" are discussed as mechanisms of transference in the model, although the data do not allow a test of the validity of these two alternatives. Data collected for Australia as part of the International Association for the Evaluation of Educational Achievement Six Subject Survey in 1970 plus a follow-up survey of students two years later are employed to estimate the model.

Recent research into the determinants of academic achievement has employed relatively few conceptual paradigms as the vehicle of investigation. Most favoured of recent has been the "needs-press" paradigm. This paradigm was developed out of a theoretical perspective formulated by Bloom (1964) and has been applied to research data by Dave (1963), Wolf (1964), Keeves (1972), and Marjoribanks (1972), among others. This model can be represented by the equation $A_2 = A_1 + f(E_{2\cdot1})$, where A_1, A_2 represent measures of achievement at two points in time and $E_{2\cdot1}$ represents the influence of environment acting on the individual between these two time points. "The environment is conceptualised in terms of a network of forces which exert press upon the individual, with the individual's cognitive performance being a response to the environmental press" (Marjoribanks, 1975, p. 156).

This paradigm may be viewed as the internal workings of a wider theoretical perspective of the phenomenon, the cultural deficit thesis. This thesis argues that it is the deficits in the social and cultural backgrounds of individuals which are responsible for differences in achievement. Williams (1974) has argued for an alternative

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mechanism of transference in this model: one based on "social learning theory." He suggests part of the variability in children's educational performance which can be ascribed to between-family variability in environments is a function of:

1. between-family variability in the kinds of (cognitive) stimuli parents provide in the form of opportunities to interact with a wide range of physical stimuli, and in the form of opportunities to interact with appropriate models for these behaviours;
2. between-family variability in the nature of reinforcement for appropriate performance, and in the reinforcement contingencies and schedules parents use; and
3. between-family variability in the encouragement parents provide for appropriate performance, and in the expectations they hold out for the child's level of performance on these behaviours.

Marjoribanks (1975) proposed a model for the analysis of this process, based on an analytical theory of social interaction provided by Harre and Secord (1972). They take as their focal active unit the individual, who consciously acts in such a way as to guide his own behaviour toward some explicit goal. Action by the individual is thus seen as deliberate and goal specific. Harre and Secord have labelled the conditions which are required for individuals to have the power to monitor their own performance, the "enabling conditions." Within the context of the needs-press paradigm these enabling conditions can be viewed as the behavioural manifestations emanating from the presses for achievement, motivation, independence, intellectuality, etc., and in the context of the social learning paradigm they are the behavioural manifestations emanating from cognitive stimuli, reinforcement schedules, and encouragement/expectations held out by parents and teachers.

In the context of the present study these enabling conditions are postulated to consist of characteristics such as attitudes toward school and educational and occupational aspirations and expectations.

The model employed here takes individual cultural deficits and mediates their effect on achievement via these enabling conditions. Such a model may be represented as:

$$At_2 = f(b_1Dt_1, b_2E_{2\text{-}1}, b_3At_1)$$

where achievement at time 2 (At_2) is a function of cultural deficit in background conditions at time 1 (Dt_1), a set of enabling conditions current between times 1 and 2 ($E_{2\text{-}1}$) and achievement at time 1 (At_1).

The simplest form of this model is linear-additive. Nonlinearity of particular measurement scales was dismissed as a substantive problem, as standardised regression coefficients were to be used in interpreting the relationships (c.f. Boyle, 1970). An additive form of the model was chosen for two reasons: (a) so as to give results which could be directly compared to those found in the earlier study by Marjoribanks (1975) and, (b) so as to yield straightforward results of the most parsimonious interpretation of the model. To have chosen a multiplicative form of the model would have introduced problems similar to those found in interpreting commonality analysis when several variables are involved (c.f., Wold & Noonan, 1976). The above form of the model implies that cognitive performance is an additive function of initial cultural conditions prevailing in the child's home and that the influence of these conditions are mediated via enabling conditions in their effects on cognitive achievement. However, as the constructs representing the enabling conditions

each have residuals attached, the initial conditions are not considered to determine them completely. What these residuals represent is left unanalyzed within the model, although they may be thought of as representing both measurement error and ignorance of the full determinants of a particular construct.

Data

The data employed were those collected by the Australian Council for Educational Research (ACER) as a participant organization in a survey conducted by the International Association for the Evaluation of Educational Achievement (IEA). The data collected (during 1970) in Australia covered only one of the six subject areas – science – for two school populations, known as *population 2*: all students aged 14.0 to 14.11 years at the time of testing (this was the last point in most of the national school systems surveyed where 100% of an age group were still in compulsory schooling), and *population 4*: all students who were in the terminal year of those full-time secondary education programmes which were either pre-university programmes or programmes of the same length. Two years after this initial survey ACER conducted a follow-up survey of participants in population 2. Separate questionnaires were developed for those who were still at school and those who had left school.

The data employed in the present study were drawn from the population 2 data and its associated follow-up survey of those students still in full-time schooling at that time.

The actual sample used in the analysis comprised a random selection from students for whom data was available for all variables in the model (i.e., listwise deletion of cases was employed in estimation of model parameters). An analysis of the representativeness of the data was presented by Rosier and Williams (1973). With respect to the marker variables (distribution of students in the grades of the defined target population, sex of students, and distribution of students in government and nongovernment schools) employed in the initial (1970) sample, Rosier and Williams stated, "In general there is a fair agreement between the population and sample values" (1973, p. 31). Due to the method of backward selection used to obtain the sample used here, it was predicted, on the hypothesis that the lower achievers were more likely to have left school, that the sample was biased upward with respect to achievement. This hypothesis was supported at the ten per cent probability level; however, there was a relatively small increase in the average scores of the sample employed, compared to that including the school leavers as well. The difference in the mean performance scores for the two samples was five per cent of the standard deviation of the distribution. Caution thus suggests that it is not possible to generalize the results of this study to the students who had left school before the age of 16 years.

Construction of Variables

The formation of particular constructs was guided by the need to adapt the "modelling aspirations" of the overall model to the state of theoretical development of each construct and the particular information available. A further consideration was that of restricting the number of variables to the number of constructs in the model. This restriction was considered necessary for the model to yield reasonably straightforward interpretative results. A proliferation of variables within constructs would have led to a much more detailed model, but one which would have contained greater ambiguity in interpretation.

The method employed in building the construct variables was to take principle component weights or factor scores after varimax rotation within a canonical factor model (Allan, 1974).

In those cases where a factor analysis did not reduce the construct to a single major factor, the decision of whether to use principle components or rotated factors was guided by three criteria: (1) where the concept of the construct was ambiguous in its causal linkage with other variables, the first principle component was used as a global index of the concept, (2) where a construct consisted of two or more clearly defined factors and one factor was clearly more indicative of the concept in question, the factor scores for that factor were employed in constructing the variable, and (3) where a subset of the indicators contributed to all factors in a construct which was relatively unambiguous in its causal linkages, this subset of indicators was refactored to produce second-order factors. In the two cases where these criteria were applied, the second-order analysis produced just the one factor[1].

Table 1 lists the constructed variables of the model according to the method by which they were derived.

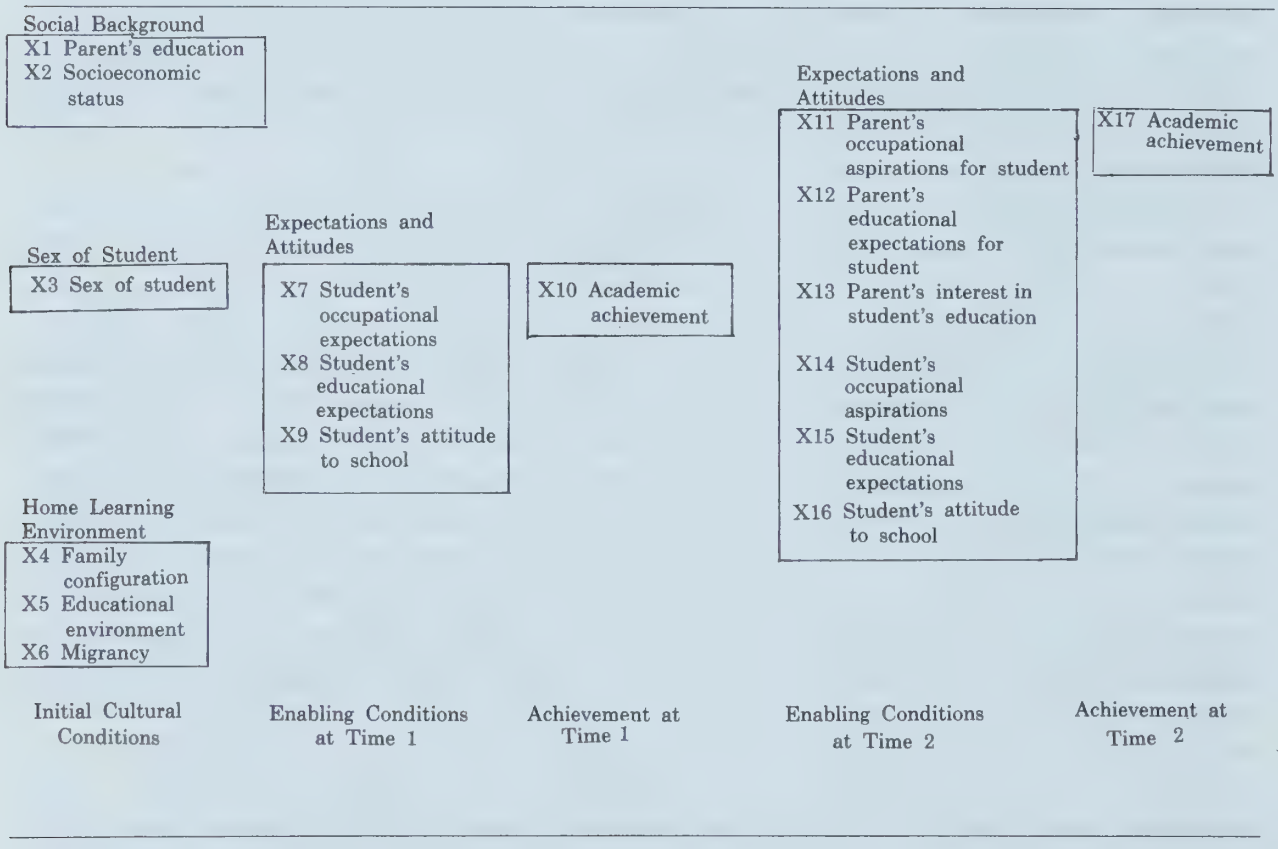

Figure 1. Causal ordering of variables in the model. (The causal ordering moves from left to right. All variables carry a residual [not shown].)

TABLE 1

DESCRIPTION OF VARIABLES

Name	*Description*	*Method of Construction* [a]
X1	Parent's education	P.C.
X2	Socio-economic status	P.C.
X3	Student's sex	S.I.
X4	Family configuration: family size and sibling position	P.C.
X5	Educational environment of the home	P.C.
X6	Migrancy: language spoken in home and length of residence in Australia	R.F.
X7	Student's expectation of future occupation at age 14	S.I.
X8	Student's expectation of years secondary schooling at age 14	S.I.
X9	Student's attitude to school at age 14	P.C.
X10	Student's cognitive performance (science score) at age 14	S.I.
X11	Parent's occupational aspirations for student at age 16	P.C.
X12	Parent's expectation of student's future education at age 16	R.F.
X13	Parent's interest in student's schooling at age 16	P.C.
X14	Student's occupational aspirations at age 16	P.C.
X15	Student's expectation of further education at age 16	P.C.
X16	Student's attitude to school at age 16	P.C.
X17	Student's cognitive performance (science score) at age 16	S.I.

[a] P.C. - principle component
S.I. - single indicator
FAC - varimax rotated factor
RF - refactored factor

Estimation of the model

Structural models such as that in focus in this research can be assessed in two different respects: (1) internal validity – the adequacy with which a proposed structure is able to describe the total set of relations among a set of observed variables while using a more parsimonious set of relations, and (2) external validity – the adequacy with which a proposed structure is able to predict theoretically endogenous variance.

As the focus of this research is to investigate the influence of particular variables on achievement and the macro process by which these influences are mediated within a presupposed theoretical framework, it is external validity which is the main concern here. External validity "is solely concerned with the ability of the structure as a source of prediction, in comparison to other structures which specify different causal structures" (Burt, 1973, p. 145). This approach assumes that the model is internally valid, i.e., that it is correctly specified. Although it would be desirable to test the internal validity of the models empirically, the lack of suitable test statistics for large models means that such analysis on the models employed here is not feasible. A further obstacle to the investigation of internal validity of large models is the necessity of including nearly all causal paths (even those which have no substantive interpretation) in the model, if it is not to be rejected as invalid. This is mainly a consequence of the relatively greater influence of measurement error and complexity of causation, as model size increases. The analysis of large models, however, is usually undertaken in order to investigate the influence of certain key variables in an expanded theoretical framework, i.e., the scientific tenet of parsimony within a wider subject area is the objective of the research. The approach taken in this study is broadly in line with this latter objective. Regression estimates of the coefficients have been made for each equation separately. The coefficient of determination can be

employed as a guide to the specification error contained in any particular equation. No formal attempt has been made to take account of measurement error in the variables. Differences in subgroup means have been accounted for by adding the relevant control variable to the model. The only case for which this was considered to be potentially significant was in the case of student sex.

The problems raised by differential repetitiveness and unequal redundancy between subsets of variables within an equation have been the focus of the methods employed in the construction of the composite variables and specification of the model. In this process, the aim was to derive variables which could be employed as measures of clearly defined conceptual linkages in the model. A degree of redundancy may however be found in the use of the variables employed as measures of parental ability and socioeconomic status. Although these are conceptually distinct, the variables used to operationalize these concepts are not so clearly differentiated. In order to overcome this problem only the variable of strongest influence will be included in an equation. Also, whether or not the alternative variable has a significant coefficient, once this has been done, is reported.

Results and Discussion[2]

The zero-order correlations presented in Table 2 indicate a set of low to moderate relationships among the variables of the model. Regression coefficients are presented in Table 3. In general the predictive power of the equations is rather low. Prediction of achievement at time 2 was influenced most by previous achievement; however, the model was not very successful ($R^2 = .19$) in predicting this earlier performance. Enabling conditions do not show a major influence on prediction of achievement, although students' expected education had a consistent influence in both cases.

TABLE 2

CORRELATIONS[a]

	X1	*X2*	*X3*	*X4*	*X5*	*X6*	*X7*	*X8*	*X9*	*X10*	*X11*	*X12*	*X13*	*X14*	*X15*	*X16*	*X17*
X2	27																
X3	-01	03															
X4	-08	-16	-12														
X5	23	23	22	09													
X6	-03	-16	-05	25	-14												
X7	11	12	01	18	04	08											
X8	18	04	01	08	11	12	50										
X9	05	01	14	05	28	-05	21	32									
X10	19	05	-18	10	00	05	35	36	10								
X11	02	15	12	01	13	-04	27	23	16	23							
X12	14	08	03	12	11	03	40	40	27	18	25						
X13	06	-08	-04	12	06	08	04	09	04	-05	-01	44					
X14	05	11	31	06	13	02	25	26	14	16	50	23	04				
X15	13	11	-02	12	15	-01	50	53	31	25	40	50	06	28			
X16	03	09	16	12	17	-04	32	31	48	18	31	40	06	27	42		
X17	15	08	-22	04	02	-02	34	36	07	75	21	11	-08	17	28	-09	

[a] All correlations multiplied by 100

The measures of social background and home environment were generally much less powerful predictors of both enabling conditions and cognitive performance than had been expected. Coleman (1975) argued that home environment and social background variables have a differential effect upon achievement according to the measure of achievement employed. Cognitive achievement as measured by performance in subject areas taught principally in the school (e.g., science, foreign

TABLE 3

STANDARDIZED REGRESSION COEFFICIENTS

DEPENDENT VARIABLES		INDEPENDENT VARIABLES															
		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	R^2
Cognitive performance at age 16	X17			-.08							.73	*	*	*	*	.14	.09	.59
Student's attitude to school at age 16	*X16*			.18							*					-.38		.25
Student's expected education at age 16	*X15*								.15		.22				.17			.29
Student's expected occupation at age 16	*X14*	*	*	.33				.19			.15			*				.16
Parent's interest in student's education at age 16	*X13*			-.19							-.13		.46					.23
Parent's expectation for student's education at age 16	*X12*								.36		*	.15						.18
Parent's aspirations for student's occupation at age 16	*X11*	*	.14	.16	*		*			.12	.15							.10
Cognitive performance at age 14	*X10*	.13	*	-.18	*	*	*		.30	.14								.19
Student's attitude to school at age 14	*X9*	*	*	.14	*	.31	*		.32									.17
Student's expected education at age 14	*X8*	.14	*	*	*	*	.12	.50										.25
Student's expected occupation at age 14	*X7*	.08	.12	*	-.21	*	.10											.22

*Indicates coefficient not significant at 5% level.

languages) is influenced less by these variables than that which is more dependent on learning in the home as well as the school (e.g., arithmetic and reading). The measure of cognitive achievement employed in this study was performance in science; the results found are similar in this respect to those reported by Marjoribanks (1975) who employed a measure of cognitive performance based on reading tests at time 1, and reading, arithmetic, and nonverbal tests at time 2.

The variable for sex of the student yielded some particularly interesting results. It had been expected that a general sex bias against girls would show up in most of the intervening variables in the model. This was found to be the case in the prediction of achievement at both times 1 and 2 and for parents' expressed interest in the student's education at time 2. (Note: The data did not include measurements on this variable at time 1.) This finding of a generally superior performance by boys, compared to girls, confirms the result reported by Keeves (1973). Although the data can themselves shed no direct light on the underlying reasons for this, it seems reasonable to suggest that it may be an indirect result of the sexual socialization which appears to dominate life in Australian society. Kelly's conclusion, based on a review of the literature related to the differential participation of the sexes in science and science education, that "At school and at work science has a masculine image, and is often rejected as unsuitable for girls; boys are encouraged from early childhood to take an interest in mechanical and scientific things, but girls are not" (1976, p. 1103), lends strong support to this argument. Further support is provided by the finding that parents expressed more interest in the progress of the educational careers of boys than girls.

The fact that there was no significant difference in expected education between the sexes at time 1, but that girls had a more positive attitude toward school suggests, however, that girls were managing to overcome much of the general negative effects of this socialization on educational expectations. Also, there was no significant difference between boys and girls in their occupational expectations at time 1, but girls were showing higher aspirations than boys at time 2. Further, girls had a more positive attitude to school at time 2 than did boys. Although these findings were not initially expected, they may be due to differences in the way occupational aspirations develop for boys and girls. If the occupational aspirations held by boys develop later than those of girls, this result may be due to an artifact of the research design. However, it may reflect a different pattern of their development between the sexes. One such pattern which would be consistent with the findings is based on the argument that as occupational aspirations are viewed as being more important to male futures than those of females, they are more dependent on "hard" data such as those evidenced by progress at school. In this case we may observe a suppressor variable effect. Girl's aspirations may not be significantly influenced by school progress, while those of boys are. Further, it may be posited that positive signs of progress for boys merely confirm self and parental aspirations, i.e., do not raise them, but that signs of no, or slower than expected, progress depress the level of these aspirations. The more positive attitude of girls to school could then be explained by the different meaning of schooling experience for girls compared to boys. An hypothesis based on the above argument is indirectly supported by the results for the equation predicting students' attitudes to school at time 2, after controlling for student sex (assuming again that the sex is acting as a suppressor variable).

Family configuration was found to have a moderate influence on occupational aspirations held by the student at time 1. A student from a large family who had older brothers and sisters was likely to have lower occupational aspirations. Children from families who had recently arrived in Australia or whose country of origin was not an advanced industrial nation, had slightly lower educational and occupational aspirations but these migrancy factors did not influence the child's attitude to school

independently of her/his educational and occupational aspirations. The educational environment of the home had a significant positive influence upon the student's attitude to school at time 1, but no independent effect upon cognitive achievement. Socioeconomic status (measured by employment of family head) had only a small influence on any of the variables at time 1; however, parental education was found to have a moderate influence on achievement at time 1. Both socioeconomic status and parental education had no significant influence in predicting variables at stage 2 once the enabling conditions and achievement at time 1 had been controlled for, with one exception. The exception was in predicting parent's occupational aspirations for their children, where parents' education had a moderate positive influence. Family configuration also exerted an influence on parents' occupational aspirations for their children, the parents of larger families having lower occupational aspirations.

Generally, the results can be interpreted as supporting a model in which social background and home environment influence early aspirations and cognitive achievement. These aspirations and achievements then mediate this influence on later achievement and aspirations. The findings support a stereotype of the achieving child as coming from a home where both parents and the child have high educational and occupational expectations, the family is small, and the child has done well academically in earlier schooling. Because of social attitudes about the role of women in our society, , boys perform better than girls on this measure of cognitive achievement. The model is relatively unsuccessful in indicating the causes of why some families provide this type of environment and others do not. The social background and family environment influences found in the model give weak support to the cultural deficit thesis.

The relatively low predictive power of many equations in the model implies either that there are major omissions with respect to predictor variables, or that measurement error is a serious problem in the model. A possible source of measurement error in the variables measuring aspirations/expectations for education and occupation is that due to the "frog pond effect." This effect argues that it is the strength of aspirations/expectations held by an individual *relative* to those held by a particular social group which are of greatest influence. In the present context this would imply that aspirations/expectations should be measured relative to those held by classmates. Some evidence in favour of this effect has been found by Toomey (1976). He found that student expectations measured relative to their classmates had greater predictive power than expectations measured relative to students across schools. Further, McDonnell and Beswick (1977) have produced recent evidence that this effect is important for predicting educational intentions among final grade students in Australia. It is thus quite possible that a replication of the analysis which measured affective attributes of students and their parents within the terms of reference group theory may give much higher predictive power to many of the equations, and hence, greater external validity to the model. Some initial attempts to develop a reference group theoretic orientation to the conceptualization of parental and student effective inputs with respect to social class, school catchment and within school sources is presented in Cuttance (1979). The main thrust of the argument presented there is based on the proposition that significant reference groups are formed within boundaries imposed upon groups of individuals by social, economic and organizational contraints due to processes of selection in society at large and within individual schools.

Another source of improvement in the external validity of the model would be to employ purposely designed direct measures in place of the abstracted (factor) indices used here. However, as the investigation was based on a secondary analysis of the data set, it was not possible to follow this "ideal" path of measurement for the concepts

incorporated in the model. Further, an alternative form of analysis based on log-linear regression would allow the incorporation of interaction effects in the model. Any decision regarding the incorporation of such effects is dependent upon one's aspirations with respect to the modelling process and would indicate an aim to investigate the form or relationship between the various concepts in the model. The aim in this study was, however, to consider the relationships at a macro level and to replicate the model proposed by Marjoribanks (1975); therefore, interaction effects were not included.

Notes

1. Further information on the factor scores and selection of indicators for inclusion in each factor is available from the author.

2. A short report of the findings discussed here is to appear in a special issue of *Studies in Educational Evaluation* devoted to work based on IEA data.

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Equality of Opportunity in American and Canadian Graduate Education: A Comparison of Gender Differences

Two aspects of equality of educational opportunity – access and treatment – in American and Canadian graduate schools are examined in this paper. To assess equality of access, data are presented on degrees awarded to women and on full-time faculty positions held by women in the two countries. Equality of treatment is assessed by examining studies of professional socialization in selected graduate schools.The results show that women are underrepresented as both faculty and graduate students in both countries. Moreover, sex differences in faculty and peer group interaction suggest that women in the United States and Canada do not receive equality of educational opportunity.

Education is a highly valued commodity in both American and Canadian societies. Ostensibly (given these nations' adherence to an ideology of opportunity), it is available at all levels to both women and men. This paper examines the concept of equality of educational opportunity for women and men in American and Canadian universities, with specific reference to graduate education.[1]

Equality of educational opportunity involves two aspects, namely, equality of access, and equality of treatment (Harvey & Lennards, 1973). Both of these notions will be considered in this paper, with emphasis on the latter. Equality of access implies access to institutions of higher learning, and the receipt of degrees. Equality of treatment implies being treated and rewarded in such a way that there is motivation to pursue higher education and motivation to finish degrees. It implies access to experiences that produce such motivation.

In order to assess equality of access to higher education, data are presented on degrees awarded to women, as well as the proportions of full-time women faculty in American and Canadian universities, using national statistics. For an assessment of equality of treatment, an examination of interactional patterns of women and men students in selected American and Canadian graduate schools is undertaken.[2] The theoretical perspective used is a model of professional socialization, based primarily on symbolic interaction theory. The following section reviews the literature and outlines the features of the perspective which have particular relevance for this analysis.

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Professional Socialization in Graduate School

In the sociology of the professions, a good deal of attention has been devoted to the question of professional socialization, particularly in the United States. However, until recently, in both the United States and Canada, sex was not considered as an independent variable. Studies focused either on the socialization of men into masculine[3] occupations such as law, medicine, engineering and academe (cf. Becker, Geer, Hughes & Strauss, 1963; Becker & Carper, 1956a, 1956b; Carper & Becker, 1957-58; Lortie, 1959: Merton, Reader & Kendall, 1957; Warkov & Zelan, 1965 in the United States, and Clifton, 1976; Reid, 1974 in Canada), or the professional socialization of women into feminine occupations such as nursing or teaching (cf. Davis & Olesen, 1963, 1965; Olesen & Whittaker, 1968; Simpson, 1967 in the United States, and Ondrack, 1974 in Canada). Women entering masculine occupations represented such an anomaly to researchers that they were excluded from the analysis.[4] In more recent studies, sex differences tended not to be analyzed or were done so superficially.

Paralleling the resurgence of feminism as an influential social movement in the West is a heightened awareness of the condition of women. This cognizance is reflected in an increasing volume of academic research on women, a good proportion of which focuses on women in academe. In the United States, many such studies may be cited (cf. Astin, 1969; Bernard, 1964, 1971; David, 1969; Graham, 1978; Hughes, 1973; LaSorte, 1971; Mitchell & Starr, 1971; Patterson, 1971; Rossi, 1970). The number of studies focusing on women in Canadian universities has also mushroomed (cf. Adam, 1971; Ambert, 1976; Andersen, 1974; Archer, 1973; Day, 1973; Hitchman, 1974; Robson & Lapointe, 1971; Symons, 1978a) and has included reports on the status of women at various Canadian universities such as the University of Alberta (Report of the Committee on the Status of Women Academics at the University of Alberta, 1975), the University of British Columbia (Day, 1973), the University of Calgary (Report of the Committee on the Status of Women at the University of Calgary, 1977), McGill University (Report of the Senate Committee on Discrimination as to Sex in the University, 1971), McMaster University (McDonald & Lenglet, 1973), Memorial University (Report on Sex Discrimination in Faculty Salaries at Memorial University of Newfoundland, 1974), Queen's University (Report of the Principal's Committee on the Status of Women at Queen's University, 1974), the University of Toronto (Report of the Committee on Employment Conditions of Full Time Faculty, 1974), the University of Waterloo (Report of the President's Advisory Committee on Equal Rights for Women and Men, 1973), York University (Report of the Senate Task Force on the Status of Women at York, 1975). However, few of these studies have dealt with the professional socialization of graduate students *per se*.

Some recent American studies of women entering masculine occupations have addressed the socialization issue and have analyzed the case of graduate students in the university (cf. Acker, 1974; Adler, 1976, 1978; Feldman, 1973, 1974; Holmstrom & Holmstrom, 1974; Kjerulff & Blood, 1973; Sells, 1975; Solomon, 1976). Professional socialization involves complex interaction patterns, and an analysis of the process focuses on interaction in the organizational setting, and the impact of the environment on individual perspectives, motivation and behaviour. Considering the case of socialization in a predominantly masculine profession, one is led to ask if the process is the same for men who are fulfilling cultural prescriptions as it is for women, for whom such endeavours represent "non-traditional" occupational choices.

For the purposes of this analysis, two aspects of the professional socialization

process[5] are examined, namely, interaction with professors (including formal and informal interaction, the nature or quality of the relationship, and the sponsorship system) and contact with peers in the graduate school setting (including academic and nonacademic encounters).

As the many American studies on professional socialization have demonstrated (cf. Baird, 1969; Becker & Carper, 1956a; Gottlieb, 1961-62; Rosen & Bates, 1967), both formal and informal participation with faculty members is crucial for the professional socialization process. By interacting with faculty members, graduate students acquire knowledge and skills, as well as the more covert rules of the game of the academic profession. Such interaction is also important for the development of a professional self-concept. Informal participation is defined as interaction that takes place outside of the office or classroom. In this situation, academic questions may or may not be discussed, but if they are, such discussion takes place in a more relaxed and informal atmosphere. Such activity with professors reinforces professional identity and aids in the professional socialization process, since it indicates to those students concerned that they are being admitted into "the club." Moreover, important research leads, tips about jobs, etc., may be passed on in such encounters.

In analyzing faculty student interaction an attempt is made to gauge the nature or quality of the relationship. This is a significant area of analysis for a number of reasons. Heiss (1967) states, for example, that

> The quality and character of the relationship between the doctoral student and his major professor is unequivocally the most sensitive and crucial element in the doctoral experience, since it not only influences the graduate student's scholarly development but also has far-reaching after effects. (p. 39)

Moreover, as Gregg (1972) notes, collegial relationships between students and faculty are positively related to student satisfaction with graduate education.

One final aspect of interaction with professors explored in this paper is the sponsorship system, which, as an ideal type, operates in the following manner. A student is chosen by a professor, or chooses and is accepted by a professor, learns her/his style and method, is perceived as an academic successor, and is later assisted in finding her/his first employment. Although this system is more prevalent and more pronounced in the natural sciences than in the social sciences or the humanities, it is nonetheless in operation in these latter fields as well. As Becker and Carper (1956a, pp. 297-298) point out, this system involves a set of interlocking responsibilities. The sponsor is accountable to her/his colleagues for presenting a certain student for hire and the student is in turn responsible to the sponsor for her/his behaviour. The protégé is expected to act responsibly as a skilled and dedicated member of the profession on a long-term basis. This obligation helps solidify the occupational identity of the graduate student.

Peer group interaction, in terms of both academic and nonacademic encounters, is also important for professional socialization. Graduate students may act as a reference group for one another, reinforcing group norms, setting standards, and monitoring behaviour. Many researchers (Baird, 1969; Becker et al., 1963; Becker & Carper, 1956a; Feldman, 1974; Rosen & Bates, 1967; Wright, 1964) note the importance of student culture for shaping attitudes and behaviour.

Methodology

Two sources of data have been employed in this paper. National statistics on degrees awarded to women and the proportion of full-time faculty positions held by

women in Canadian and American universities have been gathered for selected years. Unfortunately, such comprehensive information on professional socialization in graduate schools in the two countries is not available.

To this author's knowledge, only one systematic study has been done comparing the condition of women to that of men in Canadian graduate schools (Hitchman, 1976), and it is from this study that the Canadian data on professional socialization have been generated. Two Canadian metropolitan universities in Toronto, Ontario, were chosen for study, the University of Toronto and York University. Included in the sample were all women Ph.D. candidates enrolled full-time and in residence during the 1974-75 academic session, and enrolled in a Ph.D. programme offered by both universities. A corresponding sample of male Ph.D. students, matched in terms of discipline, university, and year of study was drawn. The academic disciplines chosen for study were categorized as natural science, including biology, zoology, chemistry and physics; social science, including political science, psychology, history, sociology, social and political thought; and humanities, consisting of English and philosophy. Questionnaires were mailed to Ph.D. candidates in the period between November 1974 and February 1975. Three hundred and fifty-nine (63%) usable questionnaires were returned, the final sample consisting of 176 women and 183 men. One hundred and twenty-two, or 34% of the sample, were York students and 237 respondents, or 66%, were from the University of Toronto. In the spring of 1975, 21 intensive interviews were conducted with a subsample of both male and female respondents.

The findings from this study are compared with those derived from various American studies, in particular, those of Acker (1974), Feldman (1973, 1974), Holmstrom and Holmstrom (1974), Kjerulff and Blood (1973), and Sells (1975). Feldman's, Holmstrom and Holmstrom's and the major part of Sells' analyses were based on data derived from a national sample of faculty and students sponsored by the Carnegie Commission of Higher Education in conjunction with the American Council on Education. Feldman's sample consisted of 32,963 students enrolled in graduate programmes (MA and Ph.D.) and graduate professional school programmes in 158 American colleges and universities. Holmstrom and Holmstrom excluded professional degree and master's students, selected a random sample of every third man (3,401 cases), and included the total group of women doctoral students (2,815). Sells used a subsample of the Carnegie sample, including only those institutions designated as "high quality universities." Kjerulff and Blood sampled 41 males and 27 females in one graduate Department of Psychology in an American university. Acker's study was based on a sample stratified by sex and field of study, of 975 American-born graduate and professional students (MA, Ph.D., and first professional degree) in science, social science, humanities, medicine, law, education, and social work, in one large midwestern university in the United States.

The author recognizes the limitations of the data base. Ideally, a national sample of both Canadian and American graduate schools would provide the appropriate data for comparing equality of treatment. Of the studies utilized in this analysis, those of Feldman, Holmstrom and Holmstrom, and Sells provide such a sample, although restricted to the United States. One does not know if the other studies are representative of graduate schools in that country. The Canadian data cannot claim to be representative, restricted as they are to two graduate schools in one province. However, the schools chosen for analysis are not uninteresting in their own right. Both are situated in one of Canada's largest metropolitan centres, and the University of Toronto is recognized as one of the most prestigious schools in Canada. York University, on the other hand, has some interesting characteristics. As an example of the trend in Canadian university expansion in the 1960's, it represents an attempt to develop a quality graduate school in a very short space of time.

While the data on equality of access are representative, the uncertainty of the representativeness of the data on equality of treatment restricts their generalizability to all American or Canadian graduate schools. However, the comparisons made in this paper are worthy of note, and provide a first step in analyzing similarities and differences in equality of opportunity in graduate education in American and Canadian universities.

Results

Equality of Access

Equality of access to higher education for women and men is measured in terms of degrees granted, and faculty positions held. In the United States as well as in Canada, women are underrepresented as both faculty and students. Table 1 presents data on participation of women in Canadian and American universities. A number of

TABLE 1

PROPORTION OF DEGREES AWARDED TO WOMEN IN CANADIAN AND AMERICAN UNIVERSITIES, AND PROPORTION OF WOMEN AS FULL-TIME FACULTY FOR SELECTED YEARS

Year	Bachelor's and First Professional Degree		Master's		Doctorate		Full-time Women Faculty	
	Canada	U.S.[a]	Canada	U.S.	Canada	U.S.	Canada	U.S.
	%	%	%	%	%	%	%	%
1919-20/								
1920-21[b]	18.3	34.2	22.0	30.2	4.2	15.1	NA	26.3
1929-30/								
1930-31[b]	25.3	39.9	21.4	40.4	15.2	15.4	NA	27.2
1939-40/								
1940-41[b]	24.1	41.3	10.5	38.2	6.7	13.0	NA	27.6
1949-50/								
1950-51[b]	20.3	23.9	13.9	29.2	5.4	9.6	NA	24.5
1959-60/								
1960-61[b]	25.7	35.3	19.0	31.6	8.5	10.5	11.7	22.0
1969-70	38.3	41.5	21.5	39.7	9.3	13.3	13.1	25.0
1970-71	38.0	43.4	22.0	40.1	9.3	14.3	12.8	23.6[c]
1971-72	39.4	43.6	24.8	40.6	9.3	15.8	13.0	22.1
1972-73	39.8	44.9	26.8	41.4	11.2	17.9	13.0	21.4
1973-74	41.5	44.2	27.2	43.0	12.3	19.1	13.0	22.6[c]
1974-75	44.4	45.3	28.2	44.8	16.1	21.3	13.9	23.7
1975-76	46.3	45.5	30.5	46.4	18.8	22.9	14.1	24.3

Sources: Dominion Bureau of Statistics. *Survey of higher education Part 2. Degrees, staff, and summary.* 1964.
Statistics Canada. *Education in Canada. A statistical review.* Catalogue Number 81-229; 1973, 1974, 1975, 1976, 1977.
U.S. Department of Health, Education and Welfare. *Digest of education statistics.* Catalogue number 74-7662. 1974, 1975, 1976, 1977-78.

[a] Cross-national data on women faculty are not strictly comparable, since included in the American data are institutions that would not be classified as universities in Canada.

[b] American data are for the first year, and Canadian data are for the second year listed.

[c] Estimated.

trends are worthy of note. For both countries the attrition rate of women increases as one moves up the academic ladder. In 1975-76, for example, women in Canada earned 46.3% of all bachelors and first professional degrees, 30.5% of master's degrees, and 18.8% of Ph.D.'s. During that same year women made up 14.1% of all full-time faculty members in Canadian universities. The corresponding data for American schools are 45.5% of first degrees, 46.4% of master's, 22.9% of doctorates, and 24.3% of the faculty. This attrition rate is consistent over most of the years listed, both in Canada and the United States.

A second observation of interest concerns change over time. The greatest increase occurs in terms of first degrees. From 1920 to 1975 the proportion of women receiving bachelor's and first professional degrees increased by 28 percentage points in Canada and by 11.3 percentage points in the United States. Master's degrees awarded to women have increased by 8.5 points in Canada, and 16.2 points in the United States. The increase in doctoral degrees has not been steady in either the United States or Canada. Indeed it was not until 1975 that Canada surpassed the proportion of Ph.D's that were awarded to women in 1930! A similar phenomenon occurred in the United States. As for women faculty, there has been a very slight increase in Canada (2.4% from 1960-1970), while the United States has experienced a decline from 1920.[6]

Finally, a comparison of the American and Canadian data demonstrates that American women have fared better than their Canadian counterparts in terms of receipt of university certification. For every year and degree level (save B.A.'s in 1975-76), women in American schools received proportionately more degrees than women in Canada. As noted in Table 1 the data on women faculty are less comparable cross-nationally than are those dealing with degrees. However, it does appear that American women have more access to academic careers than do Canadian women.

This sketch does not tell the whole story, however, for here we are concentrating on only one aspect of the concept of equality of educational opportunity. We now turn to the analysis of the second aspect, namely, equality of treatment.

Equality of Treatment

By way of background, comparison is presented of some demographic characteristics of the graduate students enrolled in the American and Canadian schools in the sample. The students in the Canadian sample average 28.6 years of age for women, and 27.2 years for men. These results are similar to those found for American schools, where in Kjerulff and Blood's (1973) sample, men averaged 25.4 years of age, and women, 26.8 years, and in Acker's (1974) sample, where 35% of men and 29% of women were between 25 and 29 years of age, with 47% of the men and 51% of the women being under 25. However, it does appear that Canadian graduate students are slightly older than their American counterparts. This could be a function of the location of the Canadian schools under study. In Ontario, five years of high school are required to obtain entrance into university. Moreover, since Canadian schools tend to be commuter institutions, it is reasonable to assume that a good proportion of the students took their high school training in Ontario.

Some noteworthy differences between American and Canadian schools are seen in terms of the citizenship status of the students. In the Canadian sample, 46% of men and 49% of women were born in Canada. Thirty-one percent of the men and 26% of the women are American. (In terms of citizen status, more women (65%) than men (55%) hold Canadian citizenship.) Comparison of these results to those of Feldman (1974) shows that only 6% of the graduates in those American schools are not United States citizens, as compared with 40% of the Canadian sample who are not Canadian citizens.

Considering religious preference, over one-half of both Canadian women (55%) and men (61%) have no stated preferred religion. These figures are considerably higher than those reported in American studies. Acker (1974) found that 25% of women and 27% of men in her sample reported their religion as agnostic or atheist, while Feldman states that 24% of the men and 19% of the women listed their current religion as "none." However, the differences could perhaps be caused by variation in the wording of the questions.[7] In both American and Canadian schools, the most common religion among men and women is Protestantism, followed by Catholicism and then Judaism.

The socioeconomic status of graduate students in American and Canadian schools is similar, that is, essentially white-collar, professional middle class. In the Canadian sample, 75% of women and 67% of men have fathers engaged in white-collar occupations, with 53% of the fathers of women and 48% of the fathers of men engaged in professional or managerial occupations. (Twenty-two percent of the women and 16% of the men have mothers who are professionals or managers.) These data are similar to those of Acker, who found that 77% of women and 76% of men come from white-collar homes, while in Feldman's sample, 64% of women and 62% of men do so. The somewhat lower SES of students in Feldman's sample could reflect the fact that colleges, as well as universities, are included here.

Studies of female academics in the United States (Astin, 1969; Patterson, 1971; Rossi, 1965) have shown that women faculty are less often married and have fewer children than their male counterparts. Additionally, women in academe have lower marriage rates and fewer children than women in the general population (Astin, 1969). This leads us to suspect that women graduate students should show a similar pattern. As Feldman (1974) points out, because marriage and children may be impediments to higher education for women, we expect to find significant differences in marital and parental status of women and men graduate students. In the Canadian sample, although there are no significant differences in the marital status of the sexes, the direction of the relationship indicates that more women (43%) than men (40%) are single. Fifty-three percent of the men are married as compared to 46% of the women. These data are similar to Acker's (1974), where 55% of the men and 43% of the women in that sample are married. Feldman found somewhat higher marriage rates, with 69% of the men and 56% of the women being married.

In the Canadian sample, more women than men have children, but the differences are not statistically significant. Seventy-four percent of men and 67% of women who are married, separated, divorced or widowed, are childless. Acker's data show that women are 8% less likely to have children than their male counterparts. A decade or more ago, more women academics were single and childless than their male counterparts. Trends appear to be changing, and although a small difference is still found in terms of marital status, with more women being single, the married women in the Canadian sample have slightly more children than married men. These data suggest a modification in the role of women. In the past, women were forced to choose between the career role and the wife-mother role. This no longer appears to be the case, and young women are combining both roles to a greater extent than before.

One last item of interest in the comparison of men and women graduate students in the United States and Canada relates to the question of grades. In both American and Canadian schools, women tend to receive better grades than men. Feldman (1974, p. 18) analyzed undergraduate grade-point averages, finding that GPA's of B+ or better were achieved by 37% of the men, as compared to 52% of the women. In the Canadian sample, 85% of the women and 74% of the men had a B+ or better average in their first degree. At the master's level, grades for men and women are similar, with 75% of each group receiving an A- or better. At the Ph.D. level, women again do

better than men, although the difference is not significant at the .05 level. Eighty-two percent of women and 76% of men achieved an A- or better on completed course work. Women's higher grades could perhaps be a function of the greater self-selection into graduate school among women, which would lead to more qualified women students (cf. Adler, 1976).

Interaction with Faculty

How do male and female graduate students in the United States and Canada fare in terms of interaction with faculty? Kjerulff and Blood (1973) report that in one American school, female graduate students have fewer discussions with their research advisors than do males. In terms of encounters in formal settings, the results from two Canadian schools show statistically significant, although not large, sex differences. In a given two-month period, men averaged 3.13 meetings with their advisors in the office setting, and women averaged 2.29 ($p<.05$).

The Canadian findings support those of Holmstrom and Holmstrom (1974) and Kjerulff and Blood (1973), which report that women in American graduate schools interact less with professors on an informal basis than do men. Although there are no significant differences in the number of discussions men and women have with their advisor outside the office setting ($\bar{X}$ is 1.37 for men and 1.38 for women, in a given two-month period), women are less likely than men to meet informally (i.e., for coffee breaks, meals, drinks, parties, etc.) either on or off campus with professors in their department. Almost twice as many men (27%) as women (14%) meet with professors informally once a week or more, while 41% of men and 30% of women have such contact at least twice a month. Moreover, in the Canadian sample, 14% of women state that they have no informal contact with professors at all, whereas only 6% of the men do so ($p<.05$).

Comparing men's and women's perceptions of their relationship with advisors, Kjerulff and Blood (1973) found that women view this relationship as less relaxed, jocular, egalitarian, casual or friendly than do men. Similar results are found in the Canadian sample. The question of egalitarianism, or collegiality, requires further exploration. The Canadian data indicate that for women, relationships with advisors are not necessarily egalitarian ones. In fact, men are more likely than women to describe the relationship as egalitarian. Fifty-seven percent of the men as compared to only 46% of the women state that "egalitarian" describes the relationship they have with their advisor well or very well ($p<.05$; $\gamma=.11$). Moreover, men (31%) are somewhat more likely than women (22%) to state that their advisor regards them as a colleague. These data are consistent with those of Sells (1975, p. 11) which show significant sex differences in terms of student perceptions of faculty's view of them. More men than women in her sample report that their primary faculty contact regards them as a colleague. In our sample as well, more men (34%) than women (25%) state that the professor with whom they have the most academic contact regards them as a colleague.

Furthermore, women are also significantly less likely to have discussions with their advisors concerning their advisors' research. Thirty-four percent of the women and 43% of the men in the Canadian sample had at least one such discussion during a given two-month period ($p<.05$). Discussions with one's advisor concerning the latter's research, as Kjerulff and Blood (1973, p. 630) suggest, can be considered a measure of the egalitarian nature of the relationship between student and advisor. These data suggest that women graduate students do not enjoy the same types of relationships with their advisors as do their male counterparts in either American or Canadian universities.

The importance of sponsorship in the professional socialization process in American schools is suggested by Acker (1974, p. 18). She found that for both men and women, the level of scholarly ambition (i.e., intention to publish in a professional journal) is positively correlated with enjoying sponsorship. Respondents in the Canadian study were asked to indicate the number of sponsors, both male and female, that they have. A sponsor was defined as "someone who has made efforts to give you career or research advice, direct your programme, employ you or secure jobs for you, secure financial aid, privileges, etc., for you." The Canadian data do not support the contention based on American studies that females are excluded from this system. Both men and women average one sponsor each, although a surprisingly high proportion of both sexes (43% of men; 42% of women) are without sponsorship of any kind. These proportions are slightly higher than those reported by Acker (1974, p. 17) who found that 32% of the men and 34% of the women were without sponsorship. Sells (1975, p. 12) notes that 64% of males and 50% of females in her study report having had a sponsor[8] ($p<.05$).

For the Canadian sample, some sex-status homophily[9] is evidenced in terms of sponsorship. Understandably enough (since most potential sponsors are men), there are no sex differences in terms of male sponsorship. Exactly one-half of the men and women have at least one male sponsor. However, for female sponsors, the situation is different. Of the total sample, 19% of women and 10% of men have female sponsors ($\chi^2 = 5.01$; $p<.05$; $\gamma = 0.35$). Looking at this question somewhat differently, significantly more women than men are among those graduate students who have female sponsors. Of this group, 64% are women and 36% are men ($p<.05$).

An important variable was controlled in the Canadian study which appears relevant to sponsorhip, namely, programme of study. As expected, this variable influences the number of sponsors the respondents have. Graduate students in the humanities enjoy less sponsorship than do those in the natural sciences or the social sciences. Indeed, only 47% of humanities students state that they have at least one sponsor, whereas 66% of both natural science and social science students do so ($\chi^2 = 13.57$; $p<.001$; $\gamma = -.34$). Sells (1975, p. 12) reports similar differences by field in American schools. Fifty-four percent of humanities students report sponsorship as compared to 65% of the physical sciences and 71% of the social sciences. These findings demonstrate the more pronounced sponsorship system in the natural science disciplines. The sponsorship issue is a very complex one, and much more work needs to be done before we can accurately depict its workings in the academic environment, particularly as it relates to women and men.

Before leaving this section on interaction with professors, it should be noted that for both the American and Canadian samples, interaction with professors and participation in the sponsorship system are positively related to development of professional identification.

Peer Group Interaction

Both the American and Canadian data suggest that peer group interaction is more important for women than for men. For the Canadian sample, although men and women engage in a similar number of discussions with peers concerning their research interests ($\bar{X}$ is 5.7 for men and 5.3 for women, in a given two-month period), women have a greater tendency than men to describe the discussions with peers concerning their research as helpful or extremely helpful. Seventy percent of the women as compared to only 52% of the men in the Canadian sample make this claim ($\chi^2 = 10.55$; $p<.01$; $\gamma = .29$). These results are similar to those of Kjerulff and Blood (1973, p. 629) who found that female graduate students in an American university tend to perceive their discussions with peers as more helpful than do men.

Feldman (1973) found that in American schools, women tend to interact less on an informal basis with their peers than do men. Such informal contacts with peers should be important for professional socialization by creating and solidifying friendships which provide emotional support during graduate years. In the Canadian sample, these sex differences are not evident. In fact, graduate students in general do not socialize (i.e. spend leisure time) a great deal with their peers. Less than one-third of the respondents (27% men; 32% women) state that about one-half or more of the people they see socially are also fellow graduate students in their department. A male philosophy student sums up his relationship with peers by describing them as "nonexistent." "Most of the people I simply choose not to associate with, because we share really little in common. . . . There are other things I'd rather do with my free time than socialize with the people from around here."

Another interesting difference in American and Canadian graduate schools is the importance of peer group interaction for professional socialization. Feldman (1974) found that graduate students who meet informally with their peers are more likely to plan university or college teaching careers than those who do not. In the Canadian study, surprisingly few of the indicators of interaction with fellow graduate students are related to professional identification (cf. Hitchman, 1976).

Discussion

The results of this analysis suggest both similarities and differences in terms of the condition of women and men in American and Canadian universities. Our data on equality of access show similar attrition rates of women in both countries. However, American women appear to enjoy greater equality of access in terms of both degrees granted, and faculty positions held. Considering these national statistics as a whole, we are led to question the existence of equality of access for women in both American and Canadian higher education.

In terms of interaction patterns, again, both similarities and differences are found. Women in American and Canadian graduate schools interact less with professors, perceive their relationships as less relaxed and friendly, and enjoy less collegiality with their professors than do men. However, the lack of sponsorship found in American schools does not appear in the Canadian sample.

What explanations can be offered for the sex differences found here in terms of faculty-student interaction? Are women the objects of discrimination (i.e., do faculty prefer to interact with male rather than female students?), or do female students act in such a way as to discourage faculty-student contact? If one subscribes to the discrimination hypothesis then the gender differences may be attributed to the ways in which professors perceive women students, i.e., as less committed, less serious, and/or less suited to academic pursuits. Hence, they are not perceived as future colleagues, and interaction with them on a formal or informal basis is less necessary than it is for male students. If one looks to the women students for an explanation, one could point to a model of female socialization, which tends to produce more passive, person-oriented individuals, more sensitive to criticism, and in greater need of support than their male counterparts. Hence, women students may not seek out faculty contact as aggressively as men, and being more sensitive to criticism, will tend to evaluate relationships with professors in a less positive fashion. One would not be overly cautious in suggesting that a combination of factors are at work here, in a "catch-22" situation. Lack of interaction with faculty mitigates against the formation of a professional self-concept, while lack of a professional image and the concomitant behaviour is unlikely to evoke greater faculty-student contact.

The American literature (Caplow & McGee, 1958; Epstein, 1971, 1973; Hughes,

1973) suggests that the female graduate student may be excluded from the sponsorship system. Given the sex-status distribution of graduate departments, where most potential sponsors tend to be male, women graduate students must seek out sponsors of the opposite sex. Because of cultural prescriptions regarding cross-sex behaviour, male professors may be hesitant to engage in a close working relationship of the sponsor-protégé variety with a woman. Additionally, so the argument goes, a male professor may have difficulty perceiving a female graduate student as his academic successor, fearing that she may one day desert the profession and retreat into the home (Hughes, 1973). The lack of sex differences found in terms of sponsorship in Canadian schools could reflect the very broad definition we have given it. As Acker (1974, p. 18) notes, we do not know from this question whether the sponsor takes the student seriously or will give him or her a reference for a job. Furthermore, given the sex differences in sponsorship noted by Sells (1975), and the differences found in the egalitarian nature of faculty-student relationships enjoyed by women and men, caution must be used in drawing definitive conclusions from the Canadian data. It does appear, however, that women are not excluded from this system, or at least do not perceive themselves to be excluded. The difference between Sells' data and the findings reported in the Canadian study could reflect a change in attitudes towards women over time. Perhaps when Sells' respondents were graduate students, women were considered less serious students than they are at the present time, and hence had difficulty finding sponsorship. Moreover, the differences found between the American and Canadian schools could reflect the nature of the samples. The Canadian data are limited to doctoral candidates, whereas the American data include master's candidates as well. Perhaps it is easier for women to obtain sponsorship at the doctoral level, after they have "proven" themselves as successful master's students.

Sex-status homophily suggests another possible reason for the greater sponsorship of women students than that found by Sells. Since the numbers of Canadian female faculty are growing, albeit slowly, and since some sex-status homophily is found in terms of sponsorship, it could be that these women faculty members are acting as sponsors for women students, hence augmenting the proportion of women with sponsorship. The implications of the sex-status homophilic sponsorship relation in graduate education have been elaborated elsewhere (cf. Symons, 1978b).

In terms of interaction with peers, both American and Canadian women view these relationships as more important than do men. However, differences in informal interaction patterns between the sexes found in American studies are not replicated in the Canadian one. These latter differences could perhaps be accounted for by the nature of the universities sampled. The Canadian schools under study are situated in a large urban setting, and the students live in various parts of the city. In such commuter schools, students may have more ties with the community, and hence less time to spend on an informal basis with their peers.

Weak relationships were found between peer group interaction and professional socialization in Canadian graduate schools. Perhaps the more elitist nature of graduate education in Canada can help explain these differences. Professional socialization takes place through interaction with significant others. Since these individuals are characterized as powerful, they are accorded the requisite attention and deference. Given a greater degree of elitism in Canadian schools, perhaps Canadian students view their peers as less powerful than do their American counterparts, in terms of assisting them in managing a doctoral degree. Hence, because of less recognition of the potential power of peers in Canadian schools, they are not taken into account to an extent that would affect professional identification, as is the case with American students.

The similarities in the professional socialization process found in American and Canadian graduate schools in terms of sex differences are not surprising, since Canadian graduate schools in the 1970's are modeled in large part on the American system, and the large percentage of American professors, particularly in some disciplines, provides continuity in style as well as ties with American schools that could well account for the similar socialization experiences. Furthermore, the condition of women in Canadian graduate schools is similar to that of their American counterparts. This situation is attributable to the same cause in both countries, namely the masculine nature of the university environment.

This analysis of professional socialization in American and Canadian graduate schools points to significant differences in experiences between women and men. If, as other studies and symbolic interaction theory suggest, interaction with significant others is important for socialization, women in Canadian as well as American graduate schools have less access to this avenue for professional development than do their male peers. All of the studies reported in this paper point to differential experiences of graduate school by women and men. One should not assume that because both males and females ostensibly pass through the same "shared ordeal" (Lortie, 1959) in the same institutional environment, they necessarily experience the professional socialization process in the same way. It would appear, then, that not only do women not enjoy equality of access to higher education in both the United States and Canada, but neither do they enjoy equality of treatment within these institutions.

In order to ensure equality of treatment for women and men in graduate school, both students and faculty must take the initiative. Faculty should examine their attitudes and behaviour with respect to women students, and if they are according differential treatment, they should assess if there are legitimate reasons for such discrimination. If not, attempts must be made to ensure that women students have the same access to professors, the same quality of contact, and the same serious consideration as men.

Women students, for their part, also have a role to play by initiating contact with faculty, and attempting to present a professional self-image. Support systems can be set up with other women students, where problems are discussed, and strategies planned. Women students would be wise to avoid too much reliance on faculty in times of stress, rather seeking support from other women during these low periods, for as Baird (1969) points out, when students experience stress, the faculty is often of little help. Over-reliance on professors at such times only reinforces stereotyped notions of women.

Conclusion

This research is both relevant and timely, addressing as it does an important social issue, not only for the university itself, but also for the larger societies in question. The need for more women academics has been apparent for a number of years in the United States and Canada. These highly trained women not only develop their own skills and potential, as well as add to the productivity of a country, but they also serve an important function as role models[10] (Adler, 1976; Ambert, 1976; Bernard, 1964; Rossi, 1970) for increasing numbers of female students who pass through universities. Hence, studying the condition of women graduate students has relevance not only for the academic profession, but also more far-reaching implications for the nature of the society of the future, and the sexual division of labour in North America.

Research of this nature can help us gain insights into opportunities for women in the academic profession, and by extension, for young women who enter the university

to prepare for a variety of occupations. If women in Canada and the United States are to develop their skills and realize their potential, equality of opportunity, both in terms of access and treatment, must be accorded them in the institutions of higher learning.

Notes

1. For a comparison of American and Canadian universities see Goldenberg (1974). For a history of women in higher education in the United States, see Graham, (1978) and in Canada (Hitchman, 1976, pp. 36-41).

2. Assessing the degree of equality of treatment may be done in a number of ways. For example, university structures, which incorporate such things as degree requirements, may differentially affect men and women students. A period of residency, which is usually mandatory for most master's and doctoral programmes, may deter women students who can only study part-time due to financial and/or family constraints. Lack of adequate support services such as day care may also affect men and women differently, since, in spite of alleged changes in the sexual division of labour in Canadian and American societies, women still assume the major responsibility for child care. Another way of assessing equality of treatment in higher education is to focus on the interactional setting of the graduate school, and examine the processes at work. It is the latter approach that is taken in this paper.

3. Occupations are sex-typed as masculine or feminine when "a very large majority of those in them are of one sex and when there is an associated normative expectation that this is as it should be" (Merton, quoted in Epstein, 1971, p. 68).

4. One of the few exceptions is a study done by J. J. Williams in 1950 involving women in medicine.

5. A more detailed analysis of other aspects of particular references to Canadian schools is given in Hitchman (1976).

6. For a discussion of this change in the American context see Graham (1978).

7. The questions read as follows:
   Please state your religious preference: Protestant; Roman Catholic; Jewish; None; Other. Specify. (Hitchman, 1976, p. 338).
   What is your present religion? Protestant; Roman Catholic; Jewish; Other; None; No answer. (Feldman, 1974, p. 204)
   In Acker's (1974) study, the exact question is not reported, but respondents were asked to state their own "current religion."

8. It should be noted here that Sell's definition of sponsorship differs somewhat from ours. Her question reads "As a graduate student, was there a faculty member who acted as your 'sponsor' when you were looking for your first job?" It was addressed to faculty respondents who participated in the Carnegie study on higher education.

9. The term status homophily was first used by Lazarsfeld and Merton (1954, p. 24) to describe the friendship process. This concept was extended by Kandel (1966) and Marx and Spray (1971) to include the therapeutic process. The notion of status homophily may be extended to the case of the faculty-student relationship in graduate school. Homophily is used here to refer to similarities between certain characteristics of faculty and graduate students that may affect the socialization process. It is the influence of sex-status homophilic faculty-student relationships that is considered. For an analysis of the significance of sex-status homophily for professional socialization see Symons (1978b).

10. The relationship between faculty and students is not a simple one. For a discussion of this issue with respect to graduate students, which considers both the sex of the faculty as well as that of the student, see Symons (1978b).

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Teachers and Decisions

In this study, an attempt is made to examine the types of decisions with which teachers wish to be involved. Questionnaires asking respondents to select a type of decisional approach were sent to 500 elementary and secondary teachers in six school districts within Ontario, Canada. Responses were received from 49.4% of those surveyed. Percentages and chi square tests were employed as analytical instruments. The findings indicated that: (a) teachers do not wish to make the final decision in matters dealing with discipline, economics, or home-school problems; (b) in the curriculum area, they wish only an equal voice with the principal; (c) in federation matters, they desire sole authority on decisional questions; and (d) they want greater consultative involvement in the decision-making process.

Ideally, Louis J. Rubin (1970) argues, "a school should be a synergy in which the forces of its several components unite in the accomplishment of the organizational goals" (p. 52). Two of the components to which he refers are obviously principals and teachers, and one of the ways in which these two factors unite to accomplish the organizational goals is through the decision-making function. That process will be examined in this paper.

There is no dearth of literature dealing with studies of educational decision-making, and most such studies seem to agree that "there is some kind of sequential order...in the process, but the agreement as to what elements are to be included is much less pronounced" (Jenson & Clark, 1964, p. 52). This tends to suggest that there is still some controversy surrounding the relative involvement of the parties involved with the decision-making process of the school environment.

The principal is presumed to be the designated leader of the contemporary school. One need only look at the job description of such a role to realize that the principles of responsibility and accountability have indeed become more augmented in recent times. If, in fact, principals are under pressure to provide "for the total education of students, supervision of all personnel and for all phases of pupil personnel administration within the building" (Cullers, 1976, p. 179), it should not be overly

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surprising that they would demand the right to be an integral part of the decision-making process. Here, they might argue, the old administrative truism seems very applicable: "responsibility without authority leads to ineffectiveness" (Nolte, 1974, p. 29), and if there is one thing that the political and social realities of the day will not tolerate, it is an ineffective and inefficient principal.

The desire of teachers to be included in the decision-making process is enunciated quite well by Rubin (1970) who states that

> whether they have the right to or not, and whether they act from necessity or desire, teachers are asking for the power to affect the educational policies of the schools in which they work. Teachers are seeking, in short, to make the privileges inherent in the traditional idea of democratic leadership more of a reality. (p.54)

While one might argue that there are a multitude of factors responsible for this growing desire on the part of the instructional staff to become more involved in the decisional process, two predominant arguments stand out. One is that as the teacher unions and federations have increased their power bases, the strength has siphoned down into the ranks of the individual schools, and hence has affected the process of decision-making at that level. A second argument often advocated for increased participation in this area has been noted repeatedly in the literature. It deals with the basic assumption that the morale of workers increases when they feel that they are a significant part of the decisional process, and only when such authentic involvement occurs will the educational environment operate at its optimum level.

Hence, the traditional role of the principal, however benevolent the latter may be, as the sole decision-maker within the school setting is undergoing a re-examination. This study is an attempt to contribute to such a movement. It will try to ascertain if, in fact, teachers do wish to be involved in all decisions made at the school level, or if such involvement is really only sought in certain specific areas. Prior to outlining the findings, however, a description of the methodology employed to collect and analyze the data will be offered.

Methodology

Five hundred questionnaires were randomly distributed to teachers employed by six county school boards in Ontario, Canada. Each questionnaire listed twenty problem statements which could be categorized into five specific areas: (1) curriculum, (2) economic matters, (3) federation, (4) discipline, and (5) parental problems. There were four problem statements for each of the areas. These decisional situations had been identified through the following process.

A group of twenty-five teachers were each asked to list randomly, decisional matters that could arise in an educational setting. The researcher, along with a colleague, collated the responses and categorized each one of them under one of the five specific areas mentioned previously. The teachers were then asked individually to rank order, on the basis of frequency of occurrence, the decisional situations placed under each major heading. The results were tabulated and the four decisional situations arising the most frequently in each category were determined. The twenty situations were then listed in random order on the questionnaire. Finally, a pretest of the instrument was conducted on a group of thirty-six teachers from the local area to verify the clarity and validity of the decisional situations identified.

The recipients of the questionnaire were requested to indicate their feelings about involvement in the decision-making process by selecting one of the following responses for each problem presented:

a. A decision by the principal alone,

b. A decision by the principal after a consultation with each member of the staff involved in implementing the decision,

c. A combined decision by the principals and teachers together, or

d. A decision by the teachers alone.

Percentages were then calculated on the basis of the number of responses selected for each problem area.

In addition, the questionnaire also requested demographic information concerning the sex and age of the respondents, their years of teaching experience, and the grade level in which they carry out the majority of their teaching duties. Chi square tests were conducted on each of these variables to ascertain their relationship to the decisional selection of the respondents for each problem area.

The 247 teachers (49.4% of those surveyed) who returned the questionnaires closely resembled the population of the survey on the following variables: type and size of school, sex, age, grade level taught, teaching experience and professional preparation.

Presentation of Data

There seems to be little doubt that teachers view themselves as an integral part of the educational decision-making process. However, the data of the study suggest that they view themselves more as consultants to the principal than as sole decision-makers in most educational matters. In fact, as Table 1 indicates, of the five categories examined within this study, only one area, that dealing with federation matters, emerges as an area in which teachers feel they alone should make any necessary decisions. In each of the other four categories, the largest single percentage of respondents opted for a combined principal-teacher decision-making process. However, it is important to note that in the areas of economics, discipline and parent-school matters, the combined percentages of categories A and B, both essentially giving the principal the primary decision-making function, are greater than the percentage of respondees in category C. The only exception to this concerns decisions dealing with curriculum matters. In that area, the shared principal-teacher decision-making concept garnered greater support than the other three areas combined. It is also essential to note that although a large number of individuals elected to give the principals the ultimate decision-making authority in three of the five categories under consideration, a good portion of them felt that they should be consulted for an opinion prior to that decision. Hence, once might conclude that teachers feel that:

a. they should be the sole decision makers in federation matters;

b. in curriculum matters, decisions should be made by teachers and principals together;

c. the ultimate decision for economic, discipline and home-school matters should be left in the hands of the principal. However, a large number of teachers feel that such decisions should only be made after prior consultation with the teaching staff involved.

TABLE 1

DECISIONAL APPROACHES TO VARIOUS PROBLEM AREAS

Problem Area	*Type of Decision-Making Process By Percentage* A	B	C	D
Curriculum	8.9	17.7	61.7	11.7
Economic Matters	29.3	21.0	43.9	5.8
Federation	17.7	15.7	31.4	35.2
Discipline	23.6	26.1	42.2	8.1
Parental Matters	28.7	27.2	39.5	4.6

A = Decision By Principal Alone
B = Decision By Principal After Consultation With Teachers
C = Decision By Principal And Teachers Combined
D = Decision By Teachers Alone

Several demographic variables were also isolated within the study. These were sex, age, experience, and grade. Each of the problem areas were examined in light of these factors. Looking first at the differences created by the male-female variable, one finds that women expressed a more democratic attitude toward decision-making than the men. This appears to hold true for each of the problem areas identified here, as a higher percentage of females selected the combined decisional approach than did the males. Only in the areas of economics, federation and discipline do the age and experience variables come into play. In both of these categories, it would appear that the older the teacher, the less willing he/she is to leave the decision-making activity solely in the principal's hands. Rather, a desire was expressed to place decisions of these types under combined principal-teacher auspices. The grade level variable appears to affect the responses offered by teachers in the curriculum, discipline and federation areas. In the first two categories, the data tend to indicate that secondary school teachers are more apt to allow the principal to be the sole decision-maker than are their elementary counterparts. On the other hand, when one examines decisions concerning federation matters the elementary teachers are the ones more willing to share decision-making rights. The secondary teachers responded that decisions about federation matters should fall primarily into the teachers' domain.

Analysis of Data

Contrary to suggestions by Chase (1953) and Cullers (1976) that teachers expect democratic administration from their principals, the results of this study indicate rather that principals are expected to make the ultimate decisions about school economic matters, discipline, and home-school problems on their own. One possible reason for this position in the latter two areas might be a realization and acquiescence on the part of teachers to the existent community role expectations for the principal. As Woodring (1978) and Thompson (1977) point out, very often the parents may expect the principal to employ a more authoritarian style of leadership with both staff and students. The rationale for the data dealing with decisions about school economic matters might well be that provided by Hall (1972). He argues that, "where decisions are routine and information standardized, or if the tasks are well structured or familiar, a more authoritarian style is appropriate" (p. 250).

Hence, one might argue that school economic matters are structured, to a great extent, by local budget constraints and guidelines, and in most cases, are made in a school situation on the basis of fairly standardized information. Moreover, the principal probably could be said to have the best overall perspective on the situation, and hence be the only one with the information base necessary to make the most appropriate decision. Thus, the teachers acquiesce to the principal in these matters.

Teacher demand for equal involvement in curriculum decisions is not overly surprising. A study by Inkpen, Ponder, and Crocker (1974) indicated that teachers do indeed desire increased opportunity for participation in these matters. The data of this study substantiate their conclusions. Since teachers are both the individual in constant contact with the needs and abilities existent within the classroom, and the actual "delivery system" of the curriculum process, it is quite apparent that they do have a sizeable investment in ascertaining the appropriateness of the curriculum for their classroom. On the other hand, a realization that someone must coordinate the overall program within the school might account for teachers' feelings that principals should also have a voice in decisions of this nature.

The final problem area examined within this paper, that dealing with federation matters, was one in which teachers felt they alone should be the decision-makers. This is not too surprising when one considers the "two hat syndrome" forced upon the principal (Awender, 1978, p. 563). The latter is expected to be part teacher and part administrator, and it is this second role that casts him in a management perspective to many teachers. Hence, there may be a natural reluctance on the part of the instructional staff to share decisions about matters, generally regarded as the domain of the rank-and-file, with quasi-management personnel.

Turning to the demographic variables examined in the study, it was discovered that females have a more democratic orientation toward educational decision-making than do males. These data coincide with an earlier study by Goldberg in 1967 which, in turn, is cited in a subsequent study by Robinson (1968). A closer examination of this variable does present another interesting trend. In all categories except the home-school area, a greater prcentage of males than females expressed a desire to relinquish the decisional process to the principals. One might speculate that this results from the possibility that generally, a higher percentage of men than women within the system traditionally have been "one income and upward bound people", and hence have found involvement in the decision-making process more of a risk-taking venture than females, and thus have been more willing to leave decisions in the hands of the principal. Both the age and experience variables demonstrated a positive relationship with involvement in the decision-making process. As might be expected, the older, more experienced teachers, perhaps feeling that they had accumulated sufficient background knowledge and experience to provide meaningful input into decisions concerning the problem areas examined in the study, laid claim to greater involvement in the decisional process. One might also speculate that additional security emanated from age and experience, and hence they perceived additional involvement in ultimate decisions as less of a risk-taking procedure than those teachers at the other end of the continuum. The study also points out that secondary school teachers are more willing than those individuals in the elementary sector to permit principals the right to make decisions in the curriculum and discipline area. Such a willingness might result from the fact that these two areas have traditionally been out of the average secondary school teacher's domain anyway. In the past, discipline has very often been assigned to a vice-principal, and curriculum matters to department heads. Thus, these individuals have not, as a general rule, made final decisions of this nature. Conversely, the secondary teachers are much more reluctant

than their elementary counterparts to give their principals a final or even equal voice in decisions about federation matters. Such a development is not all that surprising if one considers the relative historical actions of the two organizations within Ontario.

Conclusions

This study was undertaken to determine how teachers viewed their role in the decision-making process. Moreover, an attempt was made to discover how the variables of sex, age, grade level, or experience would affect their particular viewpoint.

It would appear from the findings of the study that teachers are not nearly as willing to make the final decision on matters dealing with the areas examined here as a great deal of the literature on the subject might suggest. In fact, the only area where they appear to desire the ultimate authority for decisions is that dealing with federation matters. This does not mean, however, that the teachers wish to relinquish involvement in the decision- making process. Rather, the results tend to indicate that involvement is sought. However, the form of that involvement is not decision-making authority, or even in most cases a combined decision by teachers and principals, but rather simply consultation with the principal prior to the latter making the final decision.

The study obviously has its limitations. For one thing, it has not ascertained the relative importance of each of the problem areas to the teacher. Hence, one cannot empirically co-relate the variables of importance and involvement. Nor was any attempt made to determine what the actual state of involvement by teachers in decision-making actually is. Rather, the study simply approached the question of what should be. Thus, one cannot draw conclusions about discontent between the "is" and "ought" factors, as did an earlier study by Knoop and O'Reilly (1977). Additional data on these areas may be developed at some future date.

It should also be noted here that the study did not focus upon the situational nature of leadership and decision-making outlined in the Vroom-Yetton contingency model (1973), and later validated by Vroom and Jago (1978). The model suggests that the type of decisional process that a leader might employ in a particular situation should be based upon the following set of considerations as they relate to that specific situation: the leader's information base, the congruence of the subordinate's personal goals and those of the organization, the degree of structure inherent in the problem, the necessity of obtaining subordinate acceptance of the decision, the desire to eliminate conflict and differences among subordinates, their perceptions of fairness, and finally, the degree of acceptance that is sought about the decision. For the purposes of this study, however, it was decided to pursue the question of involvement in the decision-making process from the perspective of subordinates' desires rather than from a subordinate's feasibility viewpoint established in accordance with the aforementioned model.

Hence, the results of this study suggest that teachers do not really appear to see themselves from a decisional deprivation (Belasco & Alutto, 1972) viewpoint, for they do not appear to want ultimate authority to make decisions in a large number of areas. As Ponder (1974) points out, "since involvement in decision making is a time consuming process, teachers are likely to have established a hierarchy of decision priorities" (p. 11). Rather, from the data examined here, one might conclude that a consultative deprivation exists, and it is to this that administrators should address themselves. If they do, it would appear that many of the negative feelings generated by unilateral decisions might well be eliminated, and hence an atmosphere more conducive to a sound and successful educational organization would be created.

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Systematic Desensitization of Mathematics Anxiety Among Preservice Elementary Teachers

In this study, a behavioural therapy, systematic desensitization using deep muscle relaxation, was administered to a group of preservice elementary teachers to determine its effectiveness in treating mathematics anxiety. Statistically significant reductions in mathematics anxiety were obtained as predicted. The effects of the therapy on subjects' enjoyment of mathematics and on its perceived value were also investigated. No statistically significant changes in these attitude measures were found. Finally, the relationship between mathematics anxiety and other global measures of anxiety was analyzed. Generally, the results indicated that mathematics anxiety is not an isolable phenomenon, but is related to a more globally defined notion of anxiety.

Since its introduction in 1958, systematic desensitization has been demonstrated to be an effective therapeutic technique for the reduction of anxiety with a variety of phobias: kleptomania (Mazagas, 1972), oral exams (Bruno & McCullough, 1973), mathematics anxiety with university students (Richardson & Suinn, 1973), and test-taking (Deffenbacker & Kemper, 1974), to name a few applications of the procedure.

In desensitization therapy, a physiological state inhibiting to anxiety is induced in the subject, usually deep muscle relaxation using a modification of Jacobson's progressive relaxation techniques developed in 1938. In desensitization therapy, a subject, after becoming very relaxed, is presented with a weakly anxiety-arousing stimulus. In such instances the relaxation response is stronger than the anxiety response. Over repeated exposures for brief periods of time, the association of the stimulus event with the anxiety response is gradually weakened and broken, while being built up in its stead is the new association of the same stimulus event with the relaxation response. Successively stronger stimuli are similarly introduced and treated. In a step-by-step fashion, previous associations between stimuli cues and anxiety

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responses are broken down and replaced by the new associations. This process has been called "reciprocal inhibition" by Wolpe (1958). Theoretically, the relaxation reciprocally inhibits the concurrent anxiety, thus weakening the anxiety response habit. In passing, while research studies have established the effectiveness of desensitization as a treatment procedure, they have not supported Wolpe's original account of the mechanisms of fear reduction (Sieber, O'Neil & Tobias, 1977). Other therapists have acknowledged the contributions of behavioural therapy in general and desensitization in particular, but have argued that behavioural therapy is simply not capable of accounting for all manner of behavioural change. In their view, therapists must necessarily adopt an eclectic point of view if they wish to understand behavioural changes (Lazarus, 1976, 1977).

Problem

This study was designed to investigate the viability of applying systematic desensitization therapy to alleviate mathematics anxiety (anxiety in the presence of mathematics) as exhibited by elementary teachers-in-training. Also, the relationship between attitudes and anxiety toward mathematics and the effects of systematic desensitization on this relationship were assessed.

From the literature, it was anticipated that those high anxious students receiving treatment would report a reduction in the level of mathematics anxiety to a degree beyond that of those who did not receive treatment. To provide support for this anticipation, the earlier noted study by Richardson and Suinn could be used, and it was also noted that Hyman (1974) had used desensitization to reduce mathematics anxiety among a group of high school students.

The relationship between introversion-extraversion and level of anxiety is unclear. There does seem to be some interaction between these variables on certain performance measures. Trown (1970) found that extraverts were superior on retention tests when their level of anxiety was high but were superior on transfer tests when their anxiety was low. It has been found that scores on the Taylor Manifest Anxiety Scale (MAS) are frequently a mixture of the introversion and neuroticism factors of the Eysenck Personality Inventory (EPI) and do not represent a unifactorial concept (Fenz & Epstein, 1965). The seemingly complex relationship between introversion-extraversion and anxiety was investigated further in this study. More specifically, the notion of anxiety used was that of anxiety towards mathematics.

Spielberger (1966) has emphasized the necessity of distinguishing between anxiety as a stable trait and anxiety as a more transitory state variable. The relevant question for this study concerned the status of mathematics anxiety either as a transitory state phenomenon or as a manifestation of a more global anxiety trait. The status of mathematics anxiety as a state or a trait was investigated in this study.

The effects of systematic desensitization therapy on student attitudes toward mathematics is unclear. Addleman (1972) found that systematic desensitization had no significant effect on measured attitudes. Nonetheless, conceptually it would seem that anxiety and attitudes toward mathematics ought to be dynamically interrelated. It seems likely that attitude toward mathematics measurement has suffered in the past from a lack of conceptual clarity. The use of Aiken's (1974) two scales of attitude toward mathematics in this study was an attempt to shed some light on these complex phenomena.

Sample

The subjects in the treatment group were drawn from an elementary education mathematics teaching methods class. They were drawn on the basis of scores on the

Mathematics Anxiety Rating Scale (MARS) (Suinn, 1972), given to the class at the beginning of the school term. It was to those students scoring highest on this scale that the program was offered. They were defined as the "high anxious group" within the class population. The remainder of the class was termed "mid/low anxious group."

Because of attrition the total population of the class changed over time. This meant that the treatment groups changed as well. These changes are defined in Table 1.

Participation was on a volunteer basis. Those who did volunteer were randomly assigned to one of two treatment groups (A or B).

TABLE 1

SAMPLE SIZES ON TEST OCCASIONS

	Test Occasions			
	I	II	III	IV
	Four Weeks	*Four Weeks*	*One Week*	
Group A (High Anxious, First Treatment Group)	11	11	11	8
Group B (High Anxious, Second Treatment Group)	13	7	7	7
Group C (High Anxious, No Treatment)	27			26
Group D (Mid/Low Anxious, No Treatment)	90			60

Instrumentation

Four test instruments were used in this study:

Mathematics Anxiety Rating Scale (MARS) (Suinn, Edie, Nicolletti, & Spinelli, 1972). This is a 98-item inventory of items that would presumably arouse mathematics anxiety. Its test-retest reliability on 119 college students was .78 according to Suinn. Suinn reports that its construct validity in research settings has been promising.

Aiken Attitude Scales (Aiken, 1974). This instrument is scored on two scales. Aiken reported that the eleven-item "Enjoyment of Mathematics" subscale had a coefficient Alpha of .95 based on an administration to 190 college freshmen. The ten-item "Value of Mathematics" subscale had a coefficient Alpha of .85.

State-Trait Anxiety Inventory (STAI) (Speilberger, Gorsuch & Lushene, 1970). This instrument is scored on two subscales. One of the scales measures the subject's present state of anxiety (A-State). The other scale measures anxiety as a general trait (A-Trait). Speilberger reports that the test-retest reliability of the STAI (A Trait) is relatively high but stability coefficients for STAI (A-State) tend to be relatively low, as would be expected for a measure that is designed to be influenced by situational factors. Both scales have high internal-consistency coefficients.

Eysenck Personality Inventory (EPI) (Eysenck & Eysenck, 1968). This instrument is scored on two subscales – Neuroticism and Extraversion. Test-retest reliabilities over a long period of time ranged between .80 and .94 for the separate scales as reported by Eysenck.

Procedure

Both treatment groups (A and B) received the systematic desensitization therapy based on an anxiety hierarchy constructed from their responses on the MARS. The anxiety hierarchy consisted of fifteen graded items from the MARS and three graded

items relating to the teaching of elementary school mathematics. Groups C and D received no treatment but were included for comparison purposes.

The entire experimental procedure was completed within a period of nine weeks. These nine weeks were punctuated by test administrations on four different occasions. On test occasion I the four groups were given the four tests defined above. Between test occasions I and II, Group A received the three-week therapy treatment. On test occasion II, Groups A and B were given the MARS and the Aiken Attitude Scales. Between test occasions II and III, Group B received the therapy treatment. On test occasion III, Groups A and B again were given the MARS and the Aiken Attitude Scales. Finally, these two tests were administered to all groups on test occasion IV. The procedure is summarized in Table 2.

TABLE 2
PROCEDURE SCHEDULE

	Test Occasion			
	I	*Four Weeks* II	*Four Weeks* III	*One Week* IV
Group A	Pre-Treatment	Post-Treatment	Follow-up	Follow-up
	---------Treatment---------			
Group B	Initial	Pre-Treatment	Post-Treatment	Follow-up
		---------Treatment--------		
Group C	Initial	-------No Treatment-------		Follow-up
	No Treatment			
Group D	Initial	-------No Treatment-------		Follow-up
	No Treatment			

Results

One of the purposes of the study was to investigate the relationship between anxiety toward mathematics and anxiety as defined more generally. Another purpose was to explore the relationship between mathematics anxiety and anxiety measured as a state variable and as a trait variable. The results of the test occasion I administration of the MARS, EPI and the STAI are the relevant sources of information for these questions. The means and standard deviations for the MARS, EPI and STAI are given in Table 3. The matrix of correlations for these variables is given in Table 4.

TABLE 3
MARS, EPI, AND STAI MEANS AND
STANDARD DEVIATIONS (N=125)

Instrument	*Mean*	*Standard Deviation*
MARS	197.576	45.433
STAI		
State Scale	46.368	9.873
Trait Scale	46.896	10.404
EPI		
Neuroticism Scale	34.872	5.002
Extraversion Scale	36.088	4.056

TABLE 4

CORRELATIONS AMONG THE MARS, EPI AND STAI

	MARS	*EPI Neuroticism*	*EPI Extraversion*	*STAI State*	*STAI Trait*
MARS	1.000	0.425	-0.087	0.412	0.540
EPI Neuroticism		1.000	-0.335	0.445	0.772
EPI Extraversion			1.000	-0.166	-0.279
STAI State				1.000	0.635
STAI Trait					1.000

Under the null hypothesis that the population correlation was zero, each correlation coefficient was tested for statistical significance. The results indicated that all correlations were significantly different from zero ($p<.01$, df = 123) except the correlation of MARS and EPI-Extraversion ($p\geq.333$, df = 123) and EPI-Extraversion with STAI-State ($p\geq.065$, df = 123).

Using two-way analysis of variance with repeated measures on the MARS (test occasions I and II) as one of the factors and the groups (Group A and Group B) as the other factor, a statistical significance ($\alpha = .01$) was found in the differences of the repeated measures and in the interaction of the repeated measures and the group factor. For Group A the test occasions I and II mean scores were 253.7 and 170.7 respectively. The standard deviations were 40.12 and 26.41 respectively. Corresponding mean scores for Group B were 242.3 and 223.3 with standard deviations of 22.6 and 57.6 respectively. Some of this information is included in Table 5 along with information obtained from the other test occasions and from Groups C and D.

TABLE 5
MEAN SCORES ON THE MARS FOR ALL GROUPS ON ALL THE TEST OCCASIONS

	Test Occasion			
	I	*II*	*III*	*IV*
Group A N=11	253.7	170.7	163.0	158.1 N=8
Group B N=7	242.3	223.3	191.1	188.0
Group C N=26	237.1			191.0
Group D N=60	173.2			162.0

Note: Number of subjects in Group A changes from 11 to 8 on test occasion IV as 3 subjects were unavailable at that time for assessment.

In analyzing the results for the Aiken Attitude Scales in the same way, no statistically significant differences were found.

It is apparent in Table 5 that all four groups had reduced mean scores when the data from test occasions I and IV were compared. A two-way analysis of variance with the repeated measures (test occasions I and IV) as one of the factors and the groups (Groups A, B, C, and D) as the other factor revealed a statistically significant reduction in mean scores across all of the groups ($\alpha = .01$), a statistically significant group effect ($\alpha = .01$), and a statistically significant interaction between the group factor and the repeated measures ($\alpha = .01$). Further analysis using Scheffé's multiple comparison procedure revealed statistically significant differences in mean scores from test occasion I to IV for Groups A, B, and C but not for Group D. Group C received no treatment but the members were enrolled in an elementary mathematics methods class at the time.

The remaining results were analyzed by considering each of the groups, A and B, separately. The purpose was to analyze the group scores on MARS and the Aiken Attitude Scales over time, remembering that the scales were given to each group on four separate occasions.

For Group A, a multivariate analysis of the repeated MARS measures indicated that the null hypothesis of equal means for all test occasions was not tenable ($p<.008$). Beyond that, the contrast between pre- and post-therapy administrations (Test Occasions I and II) was statistically significant ($p<.01$). With $\alpha = .05$, all other adjacent pair contrasts were not statistically significant. Conceptually, these contrasts were the only ones considered important. A similar analysis of Group A's Aiken Attitude Scales results revealed no statistically significant differences.

For Group B, a multivariate analysis of the repeated MARS measures indicated that the null hypothesis of equal mean scores for all test occasions should be rejected ($p<.04$). However, none of the adjacent pair contrasts was statistically significant ($\alpha = .05$). Beyond that, it made sense, conceptually, to average the scores from Test Occasions I and II and compare that to the average of scores from Test Occasions III and IV. (Group B received the treatment between Occasions II and III). This contrast was near statistical significance ($p \leq .052$). Analysis of the Aiken Attitude Scales results for Group B revealed no statistically significant differences.

Discussion

Most importantly, systematic desensitization as a therapeutic procedure to alleviate mathematics anxiety was successfully demonstrated. This parallels the positive results obtained by Hyman with high school students.

It should be noted that the apparent reduction in anxiety for Group A might have been attributable to the fact that the high anxious subjects in that group might have been relieved by simply having their anxieties recognized and having therapy available to them. This rival hypothesis is less convincing when the pattern of scores for the comparable Group B is analyzed. The significant interaction of the MARS repeated measures factor and the group factor in the two-way analysis of variance would imply that the therapy had a significant impact over and above that due to the subjects' expectations.

Because of the design of the study, it was not possible to determine which specific mechanisms of the therapy (directions, ways of seeing improvement, etc.) might have had a positive effect on subjects. These questions are important but were not a focus of this study. A more serious design problem was the possible confounding of the therapist with the therapy. There was no real way of separating the effect of the therapy from that of the therapist in this study. That would appear to be a design

concern of special importance for any future research work in this area.

Demonstrating the feasibility of using desensitization therapy to alleviate mathematics anxiety was the primary focus of this study, but beyond that, an attempt was made to determine the effect of the therapy on attitudes toward mathematics. This attempt was not very enlightening since the effect of the therapy on attitudes appeared to be minimal. This is similar to Addleman's results (1972). Apparently, attitude toward mathematics is not directly related to mathematics anxiety. It seems that more work of the kind that Aiken has done in identifying facets of attitude is required before attitude can be meaningfully related to other personality variables.

Finally, data were gathered to answer questions about the relationship between mathematics anxiety and other forms of anxiety. With a class of 125 students the correlations of the MARS with the A-State and A-Trait subscales of the STAI and the neuroticism and extraversion subscales of the EPS were 0.412, 0.540, 0.425, and -0.087 respectively. All were statistically significant ($\alpha = .01$) except the last one. From these results it would appear that mathematics anxiety is not an isolable phenomenon. It seems to be related to a more globally defined notion of anxiety.

In conclusion, this study marks a first attempt in reducing mathematics anxiety with elementary teachers-in-training through a behaviour therapy. This is of some importance because these teachers have significant influence on a particular age group at a time when relatively stable attitudes toward mathematics seem to be formed. More work needs to be done in developing an understanding of this anxiety and developing effective therapies for it, but the results here reported are certainly helpful and encouraging.

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PERSPECTIVES

Kohlberg's Moral Judgment Program in the Classroom: Practical Considerations

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Kohlberg's Theoretical Position

Kohlberg postulates that the term "moral" refers to a *judgment* or way in which one engages in the *decision-making* process. He notes that this "moral" type of decision-making process is confined to the structure or rationale one employs to resolve competing claims of priority, such as one's choice about an individual versus a legal right or the right of a person to life versus property jurisdiction.

Kohlberg claims that how one decides which competing claim has priority determines one's moral maturity level. Kohlberg's analysis of child and adolescent moral judgments made to certain standardized dilemmas has led him to the proposition that human beings go through what he described and distinguished as three levels of moral judgment with two stages of moral thought incorporated within each level. These stages have been presented often. The reader is referred to Kohlberg's earlier works for a detailed summary.

Moral stage structure and transition follow closely Piaget's stages of intellectual development. That is, certain modes of cognitive organization are necessary, though not sufficient, conditions for acquisition of higher levels of moral judgment. Moral stage transitions occur under conditions of disequilibrium involving moral conflict. A moral conflict is a situation where the claims of two or more individuals are discrepant (Kohlberg, 1971a).

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In essence, the conceptualization of developmental stage sequence, as maintained by Kohlberg and his colleagues, involves: (a) a prerequisite cognitive organization of structural wholeness that, (b) undergoes invariant transitions contingent upon maturational and environmental interaction. Simultaneous with cognitive changes are transformations of moral judgment when given a diversity of role-taking opportunities. Also, (c) the stage position postulates cognitive disequilibrium as a motivational condition which the individual attempts to resolve, and (d) resolution of the disequilibrium in moral conflict situations results in stage fixation or stage progression.

Kohlberg's Recommendation to the Schools

Kohlberg maintains that students are moral philosophers in that they innately formulate ideas about morality in terms of organized schemata (Kohlberg & Gilligan, 1972; Kohlberg & Turiel, 1971). Students, likewise, work in a moral environment, i.e., situations where rules, standards, values, and principles are present (Turiel, 1969), and educators are constantly engaged in the "hidden curriculum." This curriculum is one designated by the exposition of certain attitudes, values, and principles without actual formulation of moral goals and techniques (Kohlberg, 1966, 1970, 1971b).

The nature of moral education is a process in which moral teaching (i.e., classroom discussion aimed at stimulating students' movements to the next stage of moral development) is practised (Kohlberg, 1964, 1967; Kohlberg & Turiel, 1971). The ultimate goal of moral education is the development of principled level moral judgments (Kohlberg, 1971, 1971b; Kohlberg & Turiel, 1971).

The techniques involved in moral education include, first, that the teacher have knowledge of the student's present moral stage, that discussion focus on genuine moral conflicts conducive to classroom disagreement, and that the argument about the morally appropriate resolution of the conflict be stated at one stage above the present stage of the students (Kohlberg, 1966; Kohlberg & Turiel, 1971). Second, stimulation to higher stages results when the teacher, taking the position one stage above his students, focuses on the pupil's reasoning process and promotes a state of cognitive disequilibrium within the child before a suitable alternative solution to the dilemma is offered (Kohlberg & Turiel, 1971). A third aspect of moral education is that of peer and school participation. It is believed that belonging to a diversity of groups may provide greater role-taking opportunity, thus stimulating stage progress. Moreover, Kohlberg (1971b) insists, "While participation in the peer group is important, the ultimate issue of participation is, of course, the school itself. Here the principle of stimulation is by a justice structure one stage above the child's own" (pp. 283-284).

Kohlberg makes four basic claims for the appropriateness of promoting higher level moral judgments. First, he reports that cross-cultural studies suggest that the stages of moral judgment he has delineated are the natural progression of an individual's biological-psychological development. He argues,

> Accordingly, the teacher may take the stimulation of moral development as the aim of moral education. Such stimulation of development is not indoctrination; rather it is the facilitation of the child's development through a sequence which is a natural progression for him. (Kohlberg & Turiel, 1971, p. 439)

Secondly, Kohlberg proposes that as one moves through the moral developmental stages he is able to deal more effectively and more adaptively with his environment. Persons at higher stages also maintain a greater cognitive consistency of beliefs, attitudes, and judgments than those at lower judgmental levels (Kohlberg, 1971a; Turiel, 1971).

Third, Kohlberg and Turiel (1971) claim that higher moral reasoning results in more desirable behaviours and more consistency in action across situations.

> Persons at a higher level of moral development not only reason better, but they act in accordance with their judgments. Experiments demonstrate that principled persons act more honestly and live up to their beliefs in the face of inconvenience and authority more so than do people or children (sic) at lower stages. (p. 414)

Fourth, Kohlberg suggests that stage 6 reasoning is philosophically the most viable form for resolving competing moral claims:

> Almost all moral philosophers, as well as moral leaders like Abraham Lincoln or Martin Luther King, have an ethic based upon an advanced stage of moral development. The moral stages do not represent an American middle-class-value bias; they are universal. (Kohlberg & Turiel, 1971, p. 414)

In addition, Kohlberg and Elfenbein (1975) note that "the Stage 6 principle of justice as equity is the only intuitively plausible and philosophically defensible test which does not suffer from the defects of vagueness, inconsistency, and indeterminacy" (p. 639).

Kohlberg in addition claims that utilizing his curriculum is constitutional because "Stimulation of universal stages of moral reasoning is not indoctrination. It violates no civil rights and is independent of any religious doctrines or assumptions" (Kohlberg & Turiel, 1971, p. 414). Further, Kohlberg (apparently arguing from a postconventional perspective) proposes that even if his moral maturity curriculum were unconstitutional, it still should be implemented:

> The constitutional issue arises from the point of view of the child's parent, who can object to the teaching of values other than the parent's own. Respect for the parent's rights is not respect for the child's autonomy, a more legitimate concern. (Kohlberg, 1971b, p. 72)

While the authors have taken issue with a considerable number of points in regard to both Kohlberg's theoretical orientation and to his claims of empirical support in other places, the current discussion will focus on only one issue: the practicability of implementing Kohlberg's moral discussion curriculum in the school.

The Feasibility of Kohlberg's Curriculum

Kohlberg's moral maturity program is based on moral discussions taking place in the classroom and on a school-wide basis, with the aim of stimulating students' moral stage progression until a postconventional structure of moral conflict resolution is realized. Specifically, Kohlberg's program requires that:

1. Teachers have knowledge of their students' present moral stage.
2. Classroom discussion focus on genuine moral conflicts.
3. The teacher promote cognitive disequilibrium within the student as a means to foster stage transition.
4. Resolution of a particular moral conflict be presented by the teacher utilizing moral reasoning one stage above his students' present functioning.
5. Students be encouraged to engage in many peer participatory activities.
6. Ultimately, the entire school be operated such that students, teachers, and administrators engage in mutual and participatory moral conflict resolutions.

It is the purpose of the present discussion, thus, to explore each of the above points in some detail. The goal is to determine if the application of Kohlberg's curriculum to the classroom and school appears viable given the current state of the educational, as well as the socio-political, communities.

Teachers must have knowledge of their students' present moral stage. In order to achieve this goal, teachers would first have to be trained (either in the universities and/or through inservice training) by persons expert in Kohlbergian theory. The training of school teachers in identifying student moral stage responses would require a considerable number of training hours, given the experiences of these authors and some of their colleagues.

In order for the teacher to lead a discussion on moral issues effectively, the ability to process quickly a student's response for immediate moral stage estimation would be required. The ability of the majority of teachers to organize, process, and respond appropriately is suspect.

Rest (1974) states:

> Judging from the amount of time it takes to stage score a regular interview and the amount of time it takes to compose unambiguous stage-prototypic statements, it is unrealistic to expect a teacher to be computing +1 retorts to students in a group discussion. (pp. 248-249)

A doctoral dissertation by Napier (1975) tested teachers' ability to code correctly subjects' statements made to Kohlberg's *Moral Judgment Scale*, using Kohlberg's scoring manual (rather than sheer recall) as their guide. Sixty-seven elementary school teachers served as subjects. Napier concluded, "overall subjects could not correctly or accurately assess moral statements" (p. 5201A).

A second implication with respect to teachers' ability to note the moral maturity of their students appears to be that teachers would have to administer and score students' responses to Kohlberg's *Moral Judgment Scale* at least in the junior and senior high school. (In the elementary grades a preconventional level may be assumed.) Group administration and written responses to the Scale could be undertaken in the high school, provided students' reading and writing ability was not a problem. For nonreaders, individual oral administration for each student would be required. It has been our experience that oral administration of the scale takes approximately one to one-and-a-half hours per individual.

Additional time considerations are involved even when tests are not individually administered. Someone must *score* each moral protocol, at least in the high school, in order to determine the students' probable moral maturity. Thus (even ignoring Napier's results or Rest's comments) time considerations appear enormous, especially at the junior and senior high school levels. It has been the junior author's experience that a trained scorer who has considerable practice in scoring moral maturity protocols requires about an hour of scoring time per individual. For junior and senior high school teachers teaching five courses per day with 30 pupils per course, 150 hours would be consumed in scoring students' responses.

Third, it must be noted that Kohlberg is constantly revising his scoring manual, thus making each succeeding year's edition somewhat obsolete. The cost of the scoring manual (reported at approximately $40) may also tend to discourage its widespread use and dissemination to the schools.

Fourth, in order for a teacher to respond appropriately (in the Kohlbergian sense, one stage above the student's present level of functioning), the teacher must have the prerequisite cognitive and moral sophistication. In the elementary school this may not be a serious problem. However, the teacher's cognitive capacity and moral judgmental level become critical at the high school level where many students function at a stage 4 mode. In order for the teacher to respond adequately to stage 4 reasoning would require the employment of a stage 5 response. In addition, a prerequisite to stage 5 decision-making includes the capacity to reason at the formal operations level. According to Kohlberg, approximately 50% of the American population reaches formal operations (Kohlberg & Gilligan, 1972) and, currently, only 25% of the population is operating above a stage 4 morality (Kohlberg, 1971a).

Granted that teachers are perhaps above the "normal" population on the average, there remains serious doubt that the school could maintain a teaching staff if principled moral judgments became a precondition to being hired. The ACLU, teachers' unions, and other organizations are hardly apt to allow for the introduction of such a stipulation!

Proponents of Kohlberg's program might argue that teachers could be trained (through his moral curriculum) to resolve moral conflicts in terms of postconventional criteria. However, the time and cost of training would probably be more expensive than waiting for "principled thinkers" to appear at the school doorstep with teaching credentials. Kohlberg's means of resolving this problem thus far, in his "just community" project, is to assign six teachers plus two consultants for 35 students. There is some discrepancy on the number of students in the just community; Muson (1979) reports 35, whereas Power and Reimer (1977) report 65 students. Of these six teachers, two have Ph.D.'s and one is currently a doctoral student (Muson, 1979). Kohlberg's resolution to the problem of teacher's cognitive and moral sophistication is hardly viable for public education.

Classroom discussion should focus on genuine moral conflicts. The difficulty with this aspect of the moral maturity curriculum seems to be related to precisely what Kohlberg means by a genuine moral conflict. He suggests that a genuine moral conflict results when "disagreement about problematic situations" arises (Kohlberg & Turiel, 1971, p. 416). To Galbraith and Jones (1975):

> A good moral dilemma should have three characteristics. It should present a real conflict for the central character; it should include a number of moral issues for consideration; and it should generate differences of opinion among students about the appropriate response to the situation. (p. 18)

The unresolved issues involve the apparent subjective nature of an arousing situation (in addition to specifying in detail what a real conflict for the central character is). Given the variability among students (especially in the junior high school years and beyond) in cognitive and moral sophistication, a particular dilemma may be genuine for one student but not another.

In light of the variety of stages at which pupils may be functioning in a particular classroom (especially at the junior and senior high school levels), a dilemma presented for classroom discussion may be genuine (i.e., conflict-arousing) for some individuals at a specific stage of moral development but not perceived as a genuine conflict for those at lower or higher stages. Thus, the student functioning at a lower stage may not be able to appreciate the various competing claims inherent in the dilemma, whereas the student at a higher stage may consider the resolution to the dilemma obvious.

More recently, Kohlberg and Hersh (1977) have amplified the Galbraith and Jones description:

> What can teachers and schools do to stimulate moral development? The teacher must *help* the student to *consider* genuine moral conflicts, think about reasoning he uses in solving such conflicts, *see* inconsistencies and inadequacies in his way of thinking and *find* ways of resolving them. (p. 57, italics added)

The ambiguity of genuineness of a moral conflict or of how teachers can assist students in conflict resolution still seems far from clear.

Teachers should promote cognitive disequilibrium within the students as a means to promote stage transition. The genuineness of a moral dilemma is based on its arousal potential for promoting cognitive disequilibrium. However, like genuineness of a moral dilemma, the exact nature of cognitive disequilibrium appears somewhat vague.

It is difficult to be sure what Kohlberg is asserting because he gives no account of what he means by "teaching" or by "cognitive stimulation," with which he contrasts teaching (Peters, 1971, p. 243). Even if teachers were presented with a clear description and had the ability to recognize a cognitively disequilibrated individual, there would be no assurance that the method used to create cognitive disequilibrium for an individual at one moral stage would be appropriate for an individual at another moral stage (Weinreich, 1974).

Third, *evidence* for disequilibrium as a precondition for stage transition has not been provided. Two empirical investigations have failed to find support for the contention that those identified as disequilibrated are in fact experiencing such a state (Sullivan & Quarter, 1971; Wonderly & Kupfersmid, 1978). Aron (1977) notes, "Kohlberg pays lip service to the term 'equilibration,' but he offers no criteria by which one can determine whether or not an individual is actually undergoing this process" (p. 212).

Lastly, even if a clear description of cognitive disequilibrium may be offered and evidence is produced which indicates that disequilibrium can be generated for each moral judgmental stage and that disequilibrium *will* result in stage transition, there still remains the problem of providing teachers with viable techniques to promote the disequilibrium. To date, Kohlberg appears to have omitted presenting the schools with the precise means by which teachers can generate such disequilibrium.

Teachers should provide resolution to moral conflicts utilizing moral reasoning one stage above their students' present functioning. Problems with this aspect of Kohlberg's program have already been noted. As was stated by Rest (1974), it is unreasonable to assume that teachers can quickly and accurately provide +1 responses in group seminars. Rest also noted that responding one stage above that of one's students would probably not be very beneficial in fostering moral stage progression, anyway:

> There are two reasons to suppose that +1 modeling is not essential: first, cognitive developmentalists, including Piaget, usually describe the acquisition of new structures in terms of the single individual trying to reorganize his thoughts, not learning from a model; and second, new cognitive structures can be evolved in the absence of higher stage models (Who was +1 for Socrates?). (pp. 245-246)

The problem of a student understanding a response one stage above his current functioning has not been adequately resolved by Kohlberg. This is especially apparent when a +1 response requires a more advanced level of cognitive sophistication (such as, providing a stage 3 response to a stage 2 child, or offering a stage 5 retort to one functioning at a stage 4 rationale).

Another apparent problem with utilizing a +1 response to resolve moral issues in the classroom may be offered. In a typical high school class, one supposes that the spread of moral developmental variability approximates the normal curve depicted in Table 1.

TABLE 1
THE MORAL JUDGMENT DISPERSION
OF A HYPOTHETICAL HIGH SCHOOL CLASSROOM

It appears that the +1 resolution offered by the teacher under such conditions may not produce the desired outcome (i.e., stage progression). As an example, the teacher is first faced with which moral stage reflects the "norm" of the classroom. If the teacher decides to resolve the presented dilemma by utilizing a response one stage above those arguing at a stage 3 rationale, then he may run the risk of: (a) re-affirming those who are maintaining a stage 4 position that they are "right," (b) shaking the reasoning of those who are currently in a transition from stage 4 to stage 5, (c) perhaps alienating, weakening, or losing the confidence of those students currently functioning at a principled level, and (4) stating a resolution that is too advanced for those students operating at moral stages 1 and 2. Thus, at best, the teacher has only *potentially* influenced those maintaining a stage 3 orientation. This situation does not improve if another stage is selected from which a +1 resolution will be offered when the classroom approximates the above moral maturity distribution. Aron (1977) raises another critical issue:

> It seems plausible to assume that the discussion leader, having a clear idea of the higher stage which the participants are supposed to attain, may give the members of the group a variety of cues, conscious or unconscious, which indicate which solution or statement of justification is the "correct" one. Successful students are quite practical in detecting such cues. Thus, it may be that the participants in the moral discussion group do not actually experience any cognitive reorganization, but simply learn to give those answers which satisfy the discussion leader, and which earn them higher scores on the posttest. (p.211)

Students should be encouraged to engage in many peer participatory activities. While most educators, including the authors, would not object to students engaging in many group activities, there is some concern in how to implement such a recommendation in the school and classroom.

The first concern focuses on specifically what kind of peer participatory activities Kohlberg is suggesting as a means of promoting moral stage progress. In reviewing the literature, he does not appear to have delineated the appropriate kinds of activities. Surely Kohlberg is not suggesting that those who participate in youth street gangs should be encouraged to continue such participation.

An allied difficulty is the age-related nature of peer participation. There needs also to be a delineation of peer activities appropriate for moral development for various age groups. The contention is that a peer participatory activity conducive to moral development for a nine-year-old would not necessarily be a fruitful activity in promoting moral progression for a nineteen-year-old. Similarly, group activities that may foster moral transition for males at various ages may be different than the kinds of activities which would encourage moral development in females. Likewise, peer activities that would, for example, promote transition from a stage 3 to a stage 4 moral perspective would not necessarily promote moral development for those progressing from stage 4 to stage 5.

A third difficulty that arises in promoting peer participation is the extent to which teachers are currently trained in this area. Teacher training programs usually do not provide instruction in how to be a group leader, how to facilitate positive peer interaction, and the dynamics of peer groups at various chronological ages.

Ultimately, the entire school should be operated on a participatory basis for moral conflict resolution. Two basic difficulties, in addition to those already suggested, appear with respect to the implementation of a school-wide Kohlbergian program.

First, acceptance and satisfactory implementation of such a program seem to be predicated on the ability of principled level moral decision-making by the majority of teachers, administrators, and school board members. This condition seems hardly possible given the current estimate of postconventional individuals reported by Kohlberg. Unless Kohlberg is suggesting that all educators first receive moral training by his colleagues (which would increase the financial and time costs of his program considerably), the potential for a school-wide moral maturity curriculum, at present, seem unrealistic. Sullivan (1977) outlines his approach to utilizing Kohlberg's program in the Tacoma Public Schools. The cooperation of teachers, principals, superintendent, board of education and community members were all required prior to project initiation. While Sullivan does not provide the reader with a time-table, his description suggests one to two years planning prior to any significant classroom implementation. Even then, the results of the program *after* classroom implementation are not reported. Peters (1971) offers a more viable strategy:

> He (Kohlberg) does not take "good-boy" morality seriously enough either from a practical or from a theoretical point of view. Practically speaking, since few are likely to emerge beyond Kohlberg's Stages 3 and 4, it is important that our fellow citizens should be well bedded down at one or the other of these stages. (p. 678)

Hamm (1977) concurs, stating that teaching the "bag of virtues" Kohlberg disclaims is very satisfactory for the majority of citizens.

A second major difficulty with implementing a Kohlbergian program at the school-wide level seems to be that of variability in the moral stages of the crucial participants, namely, the students. Even if all pedagogists functioned at stage 6, what moral stage would be utilized to promote moral maturity, when meeting to discuss school-wide concerns, among individuals spanning 13 years and all moral stages? Orr (1974) speaks to this issue:

> There are many points at which Kohlberg has simply not taken the time to refine his proposal for a restructured school (e.g., he has not dealt with the implications of cognitive-social development for age segregation in various forms of decision-making within the school. (p.370)

Serious doubts as to the feasibility of utilizing Kohlberg's program have been offered for each step of the implementation phase. There remains one major area to be discussed: the results of those who have tried to promote higher moral reasoning within the schools. While the arguments offered may appear to be reasonable deterrents, there is the possibility that investigators may have overcome some of the obstacles sufficiently (at least on a small scale) to have promoted the moral maturity of students.

A brief review of the most available literature reveals two basic approaches. One has been to employ a Kohlbergian curriculum in the classroom for a specified period. The second has been the utilization of potential components of a Kohlbergian program such as role-playing, teaching moral philosophy, and lecturing on Kohlberg's theory and supporting research.

It should be noted that with the exception of Kohlberg's experimental attempts of a just community, most moral maturity programs have only been implemented in one or two classrooms for several weeks or a few months. However, Kohlberg has not specified his program sufficiently to mitigate the variability among studies with respect to program implementation. Also, the age of program participants is variable across studies, which makes generalizations precarious.

With respect to the literature reviewed utilizing discussion of moral dilemmas as a treatment basis, the outcomes are almost equally divided. A summary of these studies is provided in Table 2.

When interpreting Table 2, "support" indicates that there was a statistically significant difference in at least one of the following conditions: (a) the individuals engaged in discussion of moral dilemmas increased their moral maturity scores from pretest to posttest, or (b) the treatment group's moral maturity score differed significantly from the control's score at the posttest. "No support" would indicate that the above criteria were not met.

Other investigators have attempted to raise the level of moral judgment in a variety of ways. Table 3 presents a brief review of the various means researchers have employed to promote moral maturity.

TABLE 2
SUMMARY OF RESEARCH UTILIZING MORAL DISCUSSION TO PROMOTE MORAL MATURITY

Investigator	*Subjects*	*Length of Treatment*	*Results*
Blatt(In Kohlberg & Turiel, 1971)	12 - 11 & 12 yr. old Jewish children	One weekly meeting for 12 wks. (duration of meeting not provided	Support
Paolitto (1976)	17 - 8th graders from disadvantaged environment	Not stated	Support
Kavanagh (1975)	96 high schoolers	10 wks. (no further information provided)	Support
Keefe (1975)	70 - 8th graders	50 min. sessions, once/wk. for 10 wks.	Support
Grant (1975)	50 clinical pastoral students	1.5 hrs/session (no. of sessions not provided	No support
Williams (1974)	24 - 7-9 yr. olds	3 weekly sessions for 20 min./session for 8 wks.	No support
Enderle (1974)	23 educators	daily meetings for 1 wk, 3 hours/day	No support
Bong (1975)	45 - 6th graders	30 min./day 3 days/wk. for 10 wks.	Support
Turiel (1966)	44 - 7th grade males	not stated, but presumably 1 to 2 hrs per subject	No support
Turiel & Rothman (1972)	43 - 7th & 8th graders	not stated, presumably 1 hr./subject	No support
Tracy & Cross	76 - 7th grade males	not stated, presumably about 1 hr/subject	Support

TABLE 3
SUMMARY OF NON-MORAL DISCUSSION METHODS USED TO PROMOTE MORAL MATURITY

Method Used to Promote Moral Maturity	*Length of Treatment*	*Subjects*	*Results*	*Investigator*
Course in Ethics	Not stated	24 undergraduates	no change in moral maturity	St. Clair (1975)
Course in Sociology	Not stated	24 undergraduates	no change in moral maturity	St. Clair (1975)
Non-Directive role-taking	2 sessions/wk. for 2 mos.	5th graders	increase in moral maturity	Travis (1974)
Role-playing	55 min. sessions, 2/wk. for 10 wks.	55 - 5th graders	no difference in moral maturity between groups	Strong (1975)
Self Awareness Group	same as above	same as above	same as above	
Decision-making Group	same as above	same as above	same as above	
Democratic child-rearing training	2.5 hrs./wk. for 10 wks.	10 parents & their adolescent children	no difference in moral maturity	Stanley (1976)
Democratic child-rearing training	same as above	12 parents	same as above	Stanley (1976)
Interpersonal skills training	3 hrs./wk. (duration not provided)	high school students	no change in moral maturity from pretest	Sprinthall (1972)
Peer counseling or peer tutoring	not stated	same as above	same as above	Sprinthall (1972)

The results generally indicate that means other than moral discussion are even less effective in promoting moral maturity. Thus, the contention that implementation of Kohlberg's curriculum in the schools seems unfeasible at present appears to be borne out by empirical findings.

The two projects attempting to create a just community by Kohlberg have purposely been omitted thus far. The results of these two programs are currently quite controversial, therefore inclusion as support or nonsupport might be misleading.

The most recent analysis of Kohlberg's attempt at a just community in the prisons and schools is offered by Feldman (in Muson, 1979) and is soon to be published. With respect to the prison community, Feldman notes that there was little discussion of justice at group meetings and many community rules were handed down by administrators. Likewise:

> Feldman both examined the results of the moral-judgment interviews with the inmates undertaken by Kohlberg's associates and conducted interviews of his own. He concluded that the program did nothing to raise levels of moral reasoning or to lower recidivism rates. He charges that those scorers who did report improvement often knew the dates of the interviews – which could bias them in judging changes over time – and that they were under pressure from one of the consultants of the program to produce positive results. (Muson, 1979, p. 58)

Feldman's evaluation of the just community in the high schools is also pessimistic. He contends, "one senior administrator used the term 'blackmail' to describe how the staff had gotten the community to agree not to permit pot-smoking – a politically sensitive issue – at a school event" (Muson, 1979, p. 68). Further, "Feldman also interviewed senior school administrators in Cambridge about the high school project and concluded the democracy in all three programs was a sham" (Muson, 1979, p. #51). Power and Reimer's (1978) description of the just community has a more optimistic flavour, but their report does not contradict Feldman's conclusions, nor are there data provided which would suggest after three years that the just community is making moral or behavioural advancement.

The specifics of Kohlberg's program in a variety of areas seem lacking. The expectation placed on school personnel necessary for successful implementation appears unrealistic, and the current research data suggest that one's moral maturity is not readily subject to alteration. It is tempting to propose that further study be done of the efficacy of such programming. Unfortunately, results to date suggest that there is serious reason to question the legitimacy of any further investment of energy. Once again, we seem to have discovered a parameter of man that invites investigation. The fact that it doesn't stand the test rarely discourages continued conviction as to its validity.

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RESEARCH NOTES

IMPLICATIONS OF THE RIGHT TO EDUCATION LEGISLATION ON EDUCATIONAL RESEARCH

One of the goals of the International Year of the Child was to ensure that all children have a Right to Education. Until recently children in the United States, with the exception of many of the handicapped children, did have access to public education. In 1975, the United States Congress passed legislation. *The Education of All Handicapped Persons Act*, which now guarantees that every child in the U.S. will have a Right to Education. The U.S. law, Public Law 94-142, requires that handicapped children receive an "appropriate" education in the least restrictive educational environment. An appropriate education is defined according to currently accepted educational methodology. This U.S. legislation even includes a statement concerning educational research: that state and local school districts should initiate research related to the development or improvement of special education programs. However, some educational research may contravene the intent of this law, and thus specific aspects of the legislation could inhibit or confound certain research designs.

First, Public Law 94-142 states that all children identified as requiring special education must be placed in an appropriate educational program *immediately*. Any delay in the placement of a child into an appropriate program following the identification of special educational needs may serve as the basis for litigation against the school or school district. Since programming must begin immediately, any design which uses identified but unserved exceptional children as control subjects is no longer acceptable.

Second, the program for an exceptional child is designed using a team approach with the parents included as part of that team. Deviations from the goals, objectives, procedures, and methods indicated in the program are not acceptable. No longer can exceptional children be included in a research project that is not a part of their designed educational program. For example, a research design which uses exceptional children as a comparison group matched on CA or MA to normal children may no longer be allowed if the involvement of the exceptional child interferes with or has no bearing on the established appropriate educational program.

Third, research related to systematic development of educational programs is limited by this legislation. While the federal law indicates that new, innovative programs should be developed, in a "Catch 22" scheme the law limits or restricts research related to the empirical validation of any newly developed program. The law does so by stating that the child must be placed in an appropriate educational program. If the child is placed in a different program (an experimental program) the merits of that program must be explained to demonstrate that the new program is appropriate and is, according to currently accepted methodology, as adequate as the old program. The "Catch 22" aspect of this exercise is that until the experimental program is empirically validated, the merits of that program cannot be confirmed. Thus, the use of a contrast research design in which some students receiving an old or established program are contrasted with matched students receiving a new program may be challenged and serve as the source of litigation against the school or school district. Since the burden of establishing the efficacy of a new program rests with the individual States, most States are reluctant to initiate research which may result in legal action against that State's educational system. It is now easier for individual States to "pick-up" a program from elsewhere rather than initiate special education research and go out on a limb.

Right to Education Laws to include all children, similar to the U.S. federal legislation, have been discussed in many nations at various governmental levels. In Canada the apparent reluctance of provincial assemblies to move on a Right to Education Law suggests that legislation as comprehensive as that in the U.S. is not likely. However, a modified form of Right to Education Legislation should soon be passed in some provinces. The effect of Right to Education legislation on educational research in any country where such laws exist is an important issue.

The indirect effect of Public Law 94-142 in the U.S. has been to control and/or reduce educational research related to exceptional children. While the U.S. legislation was not directly aimed at controlling educational research, the effect was achieved. Government has the ability to direct and control research by the manner in which research funds are allocated as well as by direct legislation.

The issue in relation to educational research revolves around the relevance of and need for educational research and the freedom to choose a topic of concern and an appropriate research design as opposed to choosing a research topic and design which will likely be free of governmental and legal involvement. In Public Law 94-142 the funding issue is secondary to the restriction placed on educational research by the constant threat of litigation. While this law presently restricts educational research related to special education students, there is a possibility that similar legislation may emerge for all school age children with similar limitations related to educational research. The questions raised by Public Law 94-142 are as follows:

1. Is there an actual need for educational research in any or all of the education spectrums?
2. Is government competent in selecting relevant topics and directing appropriate educational research?
3. Should there exist the right to carry out research in accordance with theoretical or empirical dictates as opposed to government law and doctrine?
4. To what extent is legislation such as Public Law 94-142 setting a precedent into the future restriction or control of educational research?

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BOOK REVIEWS

ESSENTIALS OF EDUCATIONAL MEASUREMENT (3rd ed.).

By R. L. Ebel. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1979, 388 pp.

Textbooks about the principles of measurement and evaluation in teaching are abundant. Assuming that students spend two to three times as many hours with their books as with professors, prudent selection from the poll of available texts is warranted. In my judgment, at least four major factors should enter into decision-making about selection: content covered, bias in recommendations about the application of principles, clarity of presentation, and provision for students to practise the principles. Whereas textbooks should vary on the first two of these factors to accommodate different professors' values and unique purposes of a course on measurement within an overall program of teacher education, no text should falter in the latter two areas.

Ebel's third edition of *Essentials of Educational Measurement* is titled accurately. The book definitely sticks to educational measurement, as opposed to the broader domain of psychological measurement, and it does not venture much beyond essentials. Ebel opens with short chapters about the present status of educational measurement and its roles in the processes of education. The next 13 chapters deal with principles for constructing, administering, scoring, evaluating, improving, and communicating the results of classroom-based paper-and-pencil tests of achievement. The traditional item formats (essay, true-false, multiple-choice, short-answer, and matching) are covered through a rule-example-discussion presentation which almost always pairs a good with a bad illustration of preferred practice that is then examined in the discussion. Following these chapters, Ebel turns to the simpler statistical principles underlying scoring, item analysis, and reliability. The emphasis in these chapters is on improving measuring procedures used in classrooms, and the presentation again follows a rule-example-discussion format. Following a short chapter about validity regarding teacher-made tests, four quite brief chapters examine standardized achievement tests, standard scores and norms, intelligence and aptitude tests, and personality and attitude measures. The depth and breadth of discussion throughout can be estimated to some extent by this book's 375-page length compared to others that typically take 500 to 650 pages to cover these same areas. Among topics sometimes covered in other books but omitted or analyzed only very briefly in Ebel's text are: observational procedures, design and evaluation of work samples such as

individual projects, sociometric and other procedures for analyzing classroom environments, and special assessment procedures such as those involved in case studies or for study of exceptional learners (e.g., learning-disabled students). These omissions highlight Ebel's focus on essentials for measuring classroom-relevant achievement, and certainly reflect procedures that most agree should be prominently used by teachers in today's schools.

Ebel's bias about measurement techniques and their use in teaching is never in doubt. Four very clear messages are presented throughout the book. First, Ebel finds little value in jumping on the criterion-referenced test bandwagon, and states flatly that item analysis and reliability statistics do not need to be tailored specially to be used validly in such tests. Second, perhaps the most clarion note throughout the text is that teachers should not build a test, use it, and then discard it or leave it untouched until next year. Only by serious and skilled efforts to improve successive versions of test items will measurement in classrooms achieve high-quality, professional status. The third bias found in the book may grate on those who cherish traditional conceptions about content, criterion, and construct validity. According to Ebel, validity in classroom tests is a function of clear specifications of test content achieved via operational descriptions of the tasks it contains, the test's reliability, and whether the test score is used in a rationally defensible manner. Finally, the chapter on measuring personality, attitudes, and interests communicates strongly that classroom teachers very likely will not profit by using paper-and-pencil tests to gauge these factors.

Turning to the matter of clarity, Ebel is to be praised. His descriptions and explanations of principles, illustrations of their application, and rationales about the practice of sound measuring procedures in classrooms are excellent. Each chapter ends with a terse but complete set of summary statements that really do summarize the preceding content. Cross-references within the text are explicit, and a glossary of terms will aid students who study it. Users of the book will want to scrutinize formulae for occasional misprints of subscripts, and the table for calculating a KR-20 coefficient will need explanation before students read it. A second printing should remove these very minor problems. Ebel succeeds admirably in promoting attention to and comprehension of tables, figures, and formulae by clearly describing their content in text. The illustrations of how to calculate item statistics and test statistics are superior.

For practically everyone, mere reading does not ensure the ability to apply correctly and easily the principles of educational measurement. The projects and problems following most chapters are very brief and sometimes unrepresentatively easy. For computational problems, the instructor will need to calculate the answers. Students likely will require more practice to achieve competence in applying what they know.

This book, like any other, will meet fully some professors' needs and fall short of others'. As stated in the preface, it clearly is a book for an introductory course. I would encourage student teachers to keep the text after the course as a guide to good practice, especially if additional assignments were developed to extend the range of practice. Teachers returning for course work after some years of practice probably warrant a more comprehensive treatment than this book provides. Nonetheless, for courses that intend to teach essentials, Ebel's text certainly should be among those in the pool of candidates for adoption.

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CHILDREN'S RIGHTS: LEGAL AND EDUCATIONAL ISSUES. *By Heather Berkeley, Chad Gaffield and W. Gordon West (Eds.)* Toronto, Ontario: Symposium Series 9, 1978, 177 pp. (ISBN 0-7744-0169-9)

The most obvious question about a book which one is reviewing is to ask, "For whom was the book intended?" After reading *Children's Rights*, this reviewer was forced to the conclusion that this book of twelve essays could only be read with reasonable profit by those people who had the following kind of background:

1. A reasonable understanding of the history of education in Western Europe and Ontario.
2. Some knowledge of the history of juvenile delinquency and child care legislation in Ontario.
3. A good knowledge of law and legal principles as these are found in Ontario and in the American states.
4. A special interest in attempting to bring about social change through "experimental" means.

The above make up a formidable array of requirements for any reader. It would be better, instead, to look at *Children's Rights* as a collection of essays with strong value only in a few of the essays for any one particular reader.

The theme of *Children's Rights* is the lamentable lack of children's rights, especially in statute law, in Canada and the United States.

One of the most thoughtful essays in *Children's Rights* is the work prepared by Magsino. In his essay there is clear recognition of the enormously complex conditions of mass education – hundreds of thousands of teachers dealing with millions of children of various ages and abilities. As a result of recognizing this complexity, Magsino does not swing wildly in the direction of a statutory Bill of Rights which would offer all children the adult rights, for example, of freedom of speech and assembly; nor does he swing in the other direction by classing all children as being so immature and witless as to deserve deprivation of any rights until they reach the magic age of eighteen. Magsino takes a middle course between the "legalistic" and the "care" concepts of dealing with children.

Magsino divides his lists of rights into option rights in which the emphasis is upon individual freedom, and welfare rights which have their emphasis upon equality. In connection with these rights, Magsino offers interesting observations in support of his proposed categories and their contents. These observations or "defence" are an important part of the article.

It is fair to point out one grievous error that Magsino makes, and that is his assumption that the Canadian Bill or Rights might well have been expected to provide "judicial effectiveness in preserving various individual civil and political rights." The answer is that the Canadian Bill or Rights, of course, applies to federal law and jurisdiction only, and the provinces are not affected. At one point in his article, Magsino discusses the entrenchment of a Bill of Rights in a new Canadian constitution and at that point, he seems to understand that a provincial Bill of Rights might be drawn into the national bill only upon major constitutional change. However, previous comments about the federal Bill of Rights will have served to confuse the reader, especially when Magsino refers to the cases of Drybones, Lavell, and Bedard in relation to the federal Bill.

A second article worth reading is Manley-Casimir's, about the topic of discretionary justice in schools. This article makes a good companion piece for the work done by Magsino, because Manley-Casimir explores most carefully what

"discretionary" and "justice" mean for teachers and school administrators. Manley-Casimir does not advocate some form of due process for students in which a school principal holds a kind of trial with witnesses, evidence, advocates, and defenders (and all the other paraphernalia of natural justice) because Casimir seems to recognize – as the American Supreme Court did not – that it is nigh well impossible to bring natural justice into play every time a student commits some offence against school policy. But Casimir does recognize the enormous power that schools have over students and he writes well about the great need to confine, structure, and check discretionary power.

Casimir's article contains two interesting case studies of a man and a woman within a particular Chicago School. The male teacher, who was in charge of the discipline of boys, was twice as likely to suspend a boy from school for an offence as the woman was to suspend a girl for a similar offence. The case materials show that the man was greatly concerned with order and control, while the woman was far more interested in the effect of a disciplinary measure upon a particular girl and her parents.

Casimir's concern with confining, structuring, and checking power can be expressed in an age-old principle that Casimir used unobtrusively at one point in his essay – that members of a class of persons who are similarly situated (e.g., high school students) should be similarly treated.

In D'Oyley's "Schooling and Ethnic Rights," the author develops a strong argument for the rights of ethnic groups in Canada, and especially for multilingual programs which would help ethnic groups to preserve their backgrounds. For D'Oyley, multilingualism needs to be encouraged in order that the immigrant child's claim to self-realization in his own culture becomes a right.

In summary, it is accurate to observe that part of *Children's Rights* will have limited usefulness for teachers and students in the whole of Canada because of the emphasis upon Ontario and the United States. However, about one-half of the book contains articles which provide excellent material for stimulating discussion in classes, seminars, adult education groups, and the more senior grades of high schools. In fact, Eastabrook's article, "School Change and the Implication for Students' Rights," offers two excellent case studies of unsuccessful attempts to involve students in school policy-making.

One final word. A reader who is seeking a concise and precise definition of a "right" is bound to be disappointed. *Children's Rights* was obviously not organized to produce a single definition or a single list of what might be subsumed under a single definition. Instead, one has to be content with the exploration of various kinds of rights – civil, ethnic, intellectual, physical, and participatory.

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PREPARATION OF MANUSCRIPTS

1. All manuscripts must be typewritten, double spaced, and submitted in duplicate. An abstract of approximately 100 words in length, typed on a separate page, should be provided.
2. Tables must be numbered in Arabic numerals with the word 'Table' centered and in capital letters, e.g., TABLE 4. The heading of the table is to be centered below and typed in capitals. The format of tables should conform to the specifications in the APA Publications Manual.
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